THE BENDER MISSILE: A CASE STUDY

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THESIS

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ABSTRACT

Two cases have been developed to examine the concept of assigning to a Navy Laboratory the management responsibility for the development of an air-to-air missile system. The first case examines the organizational relationships and operational difficulties that have resulted from this "field development" concept. The second case discusses the Management Review, a program control technique used by the Office of the Secretary of Defense, to examine some related problems created by this different development approach. A teaching commentary is included to assist the instructor in his preparation for use of the cases in the classroom.

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ACKNOWLEDGEMENTS

The authors would like to express their appreciation to the many people who made these case studies possible. First and foremost, we wish to thank the project personnel at the Naval Weapons Center, China Lake, California, who supported our thesis effort and assisted us in making travel arrangements, scheduling interviews, and solving the numerous other problems that arise almost constantly during a research project. In addition we wish to acknowledge the personnel within the Office of the Secretary of Defense and the Department of the Navy, especially the Naval Air Systems Command, who took time from busy schedules to give us the Washington viewpoint.

We are particularly indebted to our advisors, CDR Peter DeMayo and Dr. James Jolly of the United States Naval Postgraduate School, for their guidance in putting these case studies together. They have been instrumental in bringing out the important issues and shaping the final product.

I. INTRODUCTION

This thesis began with the intent of developing case studies concerning the Exploratory and Advanced Development phases of the weapon system life cycle. The authors chose this area because of its importance on the development and production of a weapon system. Early research highlighted several subjects for investigation as potential case study material to portray the "real world" environment. Further research resulted in a two-part case study involving an air-to-air missile program and its associated development problems. The first case deals with the organizational difficulties encountered when a field activity is given the total management responsibility for a missile system development. The second case deals with the events and decisions leading up to a Management Review of the program and the resultant memorandum from the Deputy Secretary of Defense.

In an effort to maintain a degree of anonymity for the persons and organizations involved, fictional names were used in the cases. In some instances actions and decisions attributed to one person were actually made by others, but throughout an effort was made not to change their impact. This was considered necessary in order to clarify and emphasize the important points of the cases. These points have been highlighted in the teaching commentary which is included as an aid in discussing the case.

II. THE BENDER MISSILE: PROGRAM ORIENTATION

In the mid and late sixties, actual air-to-air combat situations pointed out the need for improving our air-to-air missile capability. In response to this need a Tentative Specific Operational Requirement (TSOR) was issued for the development of a weapon system designated QUICKSHOT. A Proposed Technical Approach (PTA) prepared jointly by the Naval Air Systems Command (NAVAIR) and the Naval Weapons Center (NWC) responded with a short-term RATTLER Missile product improvement program. During this period of time the Weapons Center conducted NAVAIR-funded Exploratory Development of such proposed missile concepts as CAT and the advanced seeker designs that eventually evolved into the BENDER Missile.

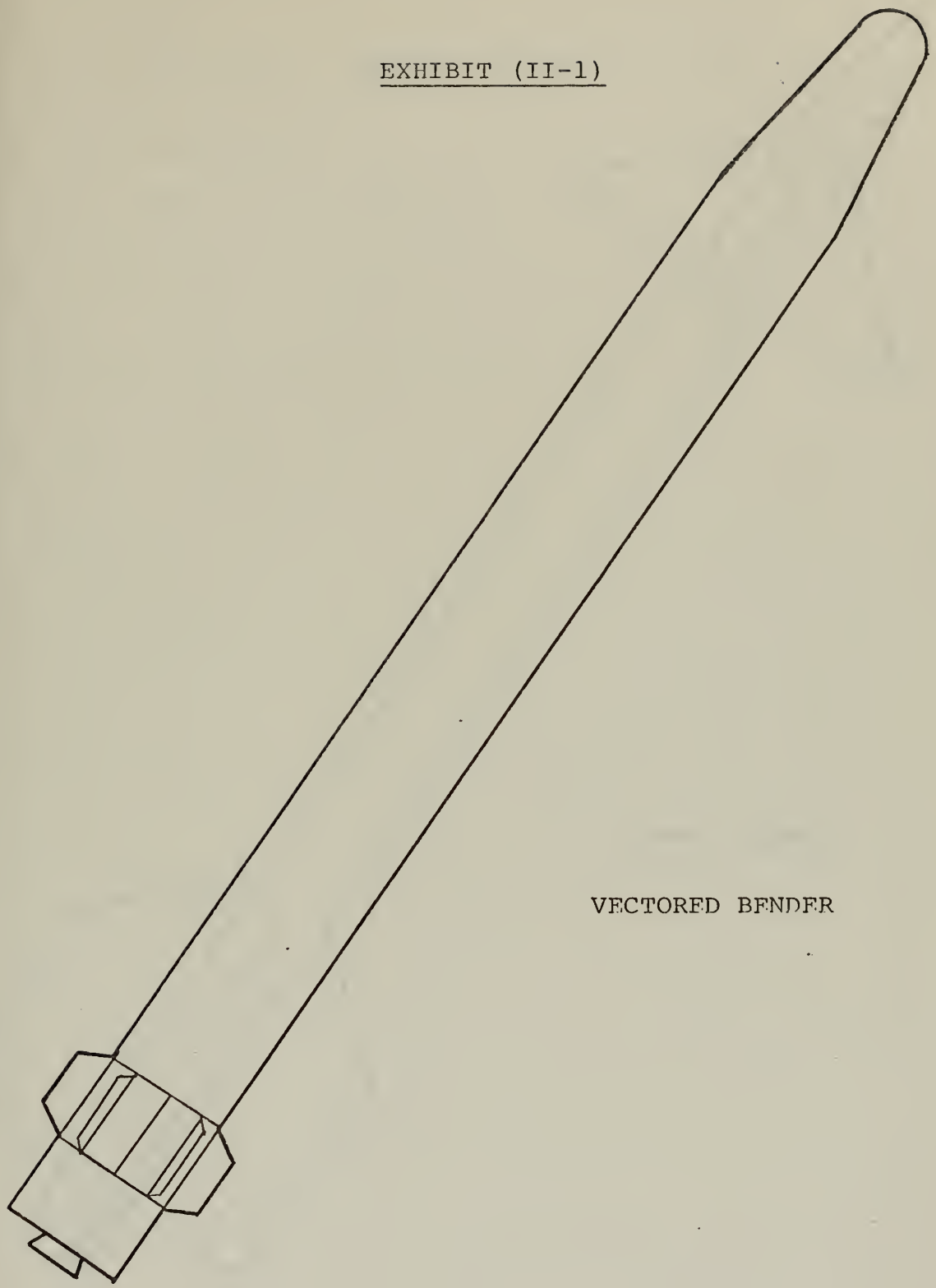
Shortly after the submission of the Navy PTA, the Air Force offered another answer to the air-to-air missile problem. They suggested the AIM-605, an Air Force project, as a possible candidate for joint service use. The Navy held to a position that the immediate need could best be met by a modified RATTLER with an Initial Operational Capability (IOC) of two years from that time. The AIM-605, which was in Advanced Development, and the BENDER were further downstream. A joint study by the Air Force and the Navy to determine the interim missile configuration found the RATTLER modification to yield the lowest development cost as well as a shorter time to IOC.

Almost two years after the TSOR was issued joint Air Force-Navy recommendations regarding the development of air-to-air missiles for joint service use were presented to the Deputy Secretary of Defense (DEPSECDEF). These recommendations were in line with the Secretary of Defense's (SECDEF) stated policy to reduce the proliferation of weapon systems that perform essentially the same mission. The recommendations were that the Navy would develop the improved RATTLER and the Air Force's AIM-605 program would be terminated. The Air Force would pursue high energy laser technology while the Navy would be the lead service for development of the BENDER Missile. The Air Force was to fund the first year of the proposed two year development of the improved RATTLER with funds from the cancelled AIM-605 program. These recommendations were concurred with by DEPSECDEF and resulted in a Development Concept Paper being issued four months later.

The program is undergoing Advanced Development and includes work on a back-up version of the BENDER Missile. The primary version (referred to as the Vectored BENDER) is highly maneuverable and has a firing envelope that is greatly increased over the current RATTLER. These two characteristics are pushing the "state-of-the-art" in air-to-air missile development and therefore the Vectored BENDER is considered to be a high risk system. The back-up version (referred to as the Dynamic BENDER) presents an increased performance capability over the improved RATTLFR but does not incorporate all the new and advanced items of the Vectored BENDER. The

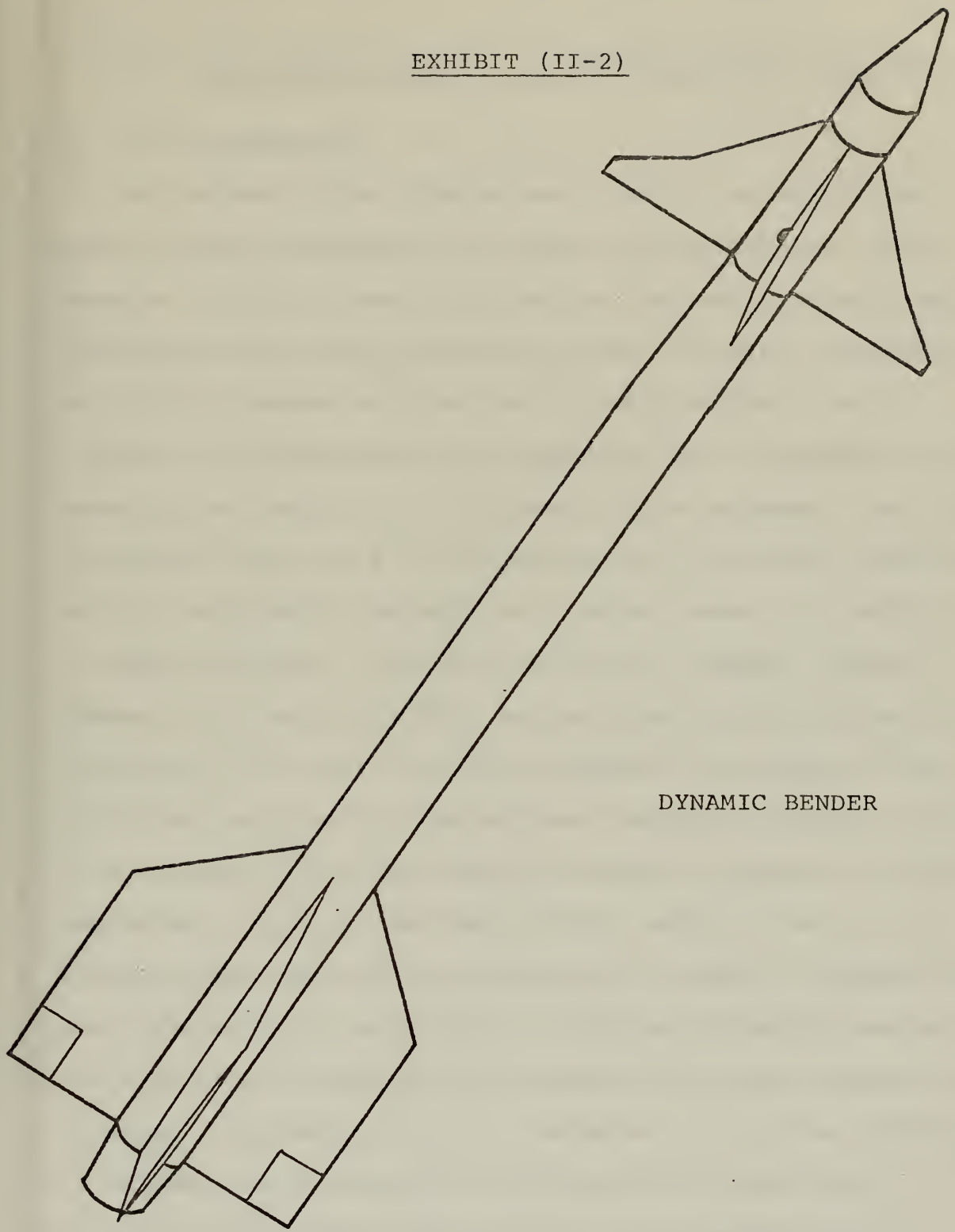
Dynamic BENDER does not possess the entire performance capability of the Vectored BENDER, but it is a considerably lower risk system to develop. The outward appearance of the two missiles evident in Exhibits (II-1) and (II-2) is quite different. The Dynamic BENDER has an appearance similar to the RATTLER, while the Vectored BENDER owes its unusual appearance to its method of propulsion and guidance.

EXHIBIT (II-1)



VECTORED BENDER

EXHIBIT (II-2)



DYNAMIC BENDER

III. THE BENDER MISSILE: AN ORGANIZATIONAL CASE STUDY

A. CASE BACKGROUND

The decade of the sixties was a period of significant technological advancement for major weapon systems. For example, aircraft that could destroy targets without visual acquisition and missiles/bombs guided by radar, television, and finally lasers were no longer "Buck Rogers," but a reality. Unfortunately this expertise did not carry over to managing the acquisition of these complex systems. In fact, during the early part of the decade cost overruns, schedule delays, and quality defects were quite common. In addition to these problems, Secretary of Defense (SECDEF) Robert McNamara was convinced that defense planning had become too fragmented. He felt it was only meeting the needs of the individual services and nobody was looking at the big picture. In an attempt to rectify the situation he planned a two-fold approach. First, he decided to shift much of the risk of system acquisition to the contractor in order to incentivize him towards better management. This was primarily accomplished via a policy of fixed price contracts and total package procurement. Secondly, to give a broader view to the problems of defense, he implemented policies which centralized decision-making within the Office of the Secretary of Defense (OSD).

By the late sixties it became apparent that these procedures were not the answer. Too often OSD became too deeply involved in second-guessing the Services and overriding decisions. In fact, some programs were almost taken over by OSD which was bad because modern programs were just too large and complex for this type of intervention. Once again the Services found themselves hamstrung in the acquisition process by a myriad of management problems centered around cost overruns, schedule delays, and quality defects. In addition, the military had lost much of its earlier public support and Congressional inquiries were becoming more numerous and detailed. The examples, such as the F-111 and C-5A, were extremely damning.

Along with the new administration in 1969 came a fresh outlook on the old problems of system acquisition management. The new DEPSECDEF, David Packard, gave his analysis of the situation in his memorandum of 28 May 1970. It has served as a basis for current DOD system acquisition policy which was officially promulgated in 1971 as DOD Directive 5000.1.[1] The directive recognized the need for improved management in the acquisition of new systems and attempted to apply generally accepted management principles to this process.[2]

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[1]DODD 5000.1 is included as Appendix A.

[2]Listed below are some of the more important provisions of DODD 5000.1 pertinent to program management organization:
1) The key factors in successful system acquisition are competent people, rational priorities, and clearly defined responsibilities.
2) Responsibility and authority for the acquisition of

Mr. Packard summed up the intent of his new policies this way:

> What we are proposing is very simple: major acquisition programs will turn out better if they are managed better. There is no better way to improve the management of a program than to get a better manager and give him the responsibility and authority to manage.[3]

For a number of years the Navy's approach to the development of air-to-air/ground missiles has been through a Naval Development Laboratory located at the Naval Weapons Center, China Lake, California. In addition to the laboratory per se, the Naval Weapons Center (NWC) encompasses the Naval Air Facility, Operational Test and Evaluation Squadron Five, and the associated missile test ranges. In its most basic form NWC is a manpower reservoir of technical experts which are continuously organized and reorganized to meet the needs of the various missile projects. In fact, NWC has been compared to a "model shop" where engineers have been pretty much left alone to "do their own thing." The results have been outstanding: SIDEWINDER, SHRIKE, and WALLEYE to mention a few.

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major defense systems shall be decentralized to the maximum practicable extent consistent with the urgency and importance of each program.
3) The development and production of a major defense system shall be managed by a single individual (program manager) who shall have a charter which provides sufficient authority to accomplish recognized program objectives.
4) Layers of authority between the program manager and his component head shall be minimal.

[3]Packard, David, Defense Industry Bulletin, p. 4, DSA, Fall 1971.

The traditional project management relationships between NWC and NAVAIR are illustrated in Exhibit (III-1) which includes the organizational/command relationships as well as the lines of communication. The project manager is chartered by and reports directly to COMNAVAIR. He reports to the Deputy Commander for Plans and Programs for administrative purposes only. The project organization interfaces with the functional divisions (Research and Technology, Material Acquisition, Contracting and Logistics & Fleet Support) through project coordination at the working level. The head of each functional division designates a project support officer as the coordinator of project requirements within the division. There is direct communication between the project management office and the field activity, but the main channel for the conduct of normal project business is through the project support officers. Normally the field activity has or will evolve an organization providing counterparts for each coordinator within the field activity and as primary points of contact for the conduct of project business. The system commands and laboratories are linked at the command level through the basic agreements and implementing task orders.

When the system command has a need for in-house laboratory services an agreement on the scope of the work contemplated, similar to the contracts used with private industry, is worked out through negotiations between the principals involved on both sides. The negotiations are less formal

TYPICAL NAVAIR-NWC PROJECT MANAGEMENT DIAGRAM

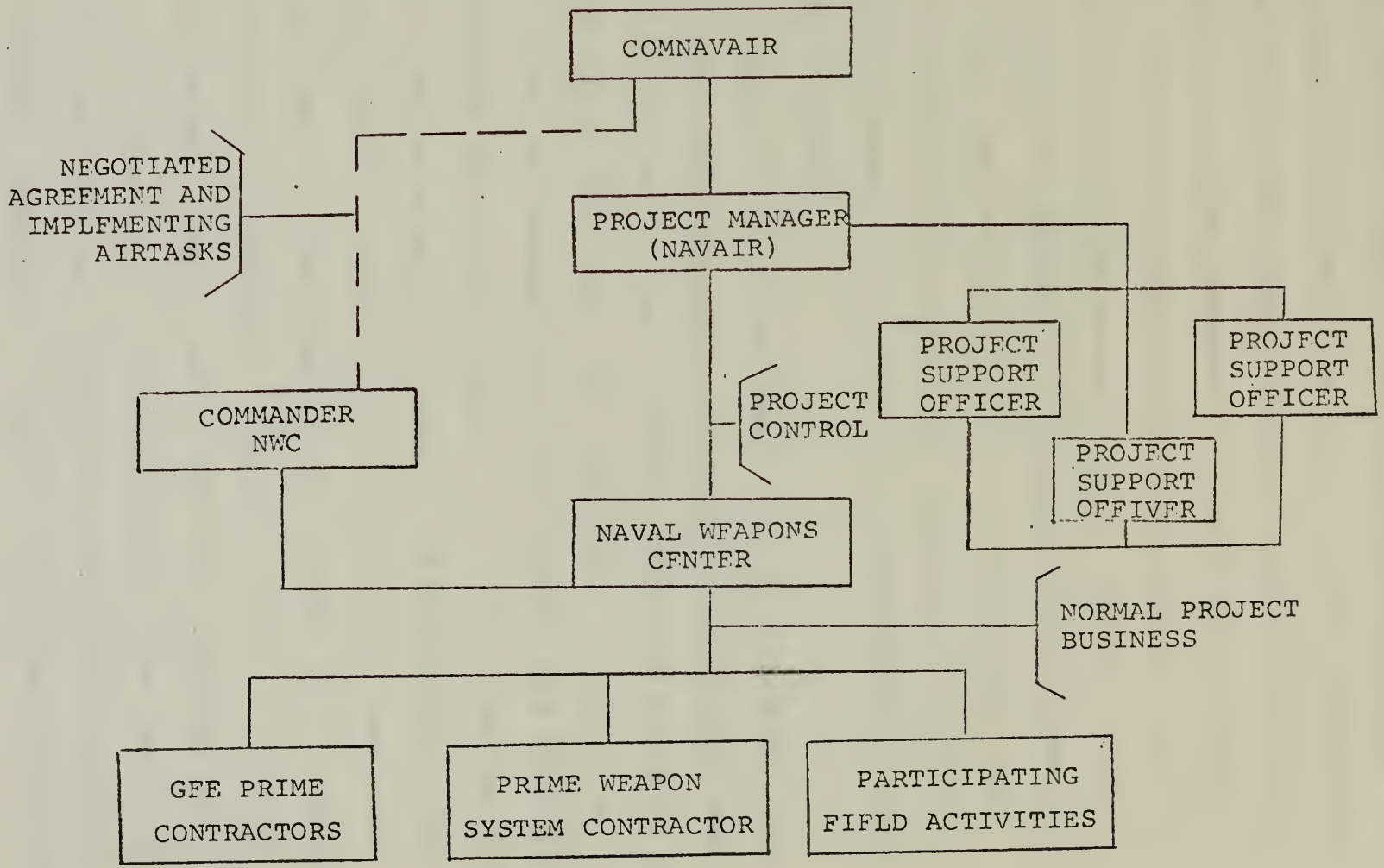


EXHIBIT (III-1)

and complicated than those required when contracting with industry, and the cost in time, the technical manhours, and the administrative steps in providing funds and program direction are far simpler. The field activity incorporates the proposed task into its Laboratory Program Summary and this serves as a formal proposal to the system command sponsor. The work proposed by the field activity may be acceptable to the system command without change in which case the only step necessary to implement the agreement is to make funds available by issuing a project order. Any necessary modifications to the work package are prepared by the systems command in the form of a task assignment letter called an airtask.

The concept of field development is not a new one. For years it has been recommended, although infrequently used, as a way to better utilize laboratory expertise while at the same time making them more cost conscious. In addition, it was felt that the laboratories could provide more accurate cost estimates and in turn prove to be a good baseline with which to compare industrial research and development costs. While the technical prowess of the laboratories has never been questioned, it has recently been argued that the system commands have not been able to keep up with the technical demands of modern complex weapon systems. Whatever the reasons, the benefits of field development have been known for quite some time and it seems that the DEPSECDEF Memorandum of May 1970 supported by the CNO Memorandum of February

1971 provided the needed impetus to initiate the field development concept.

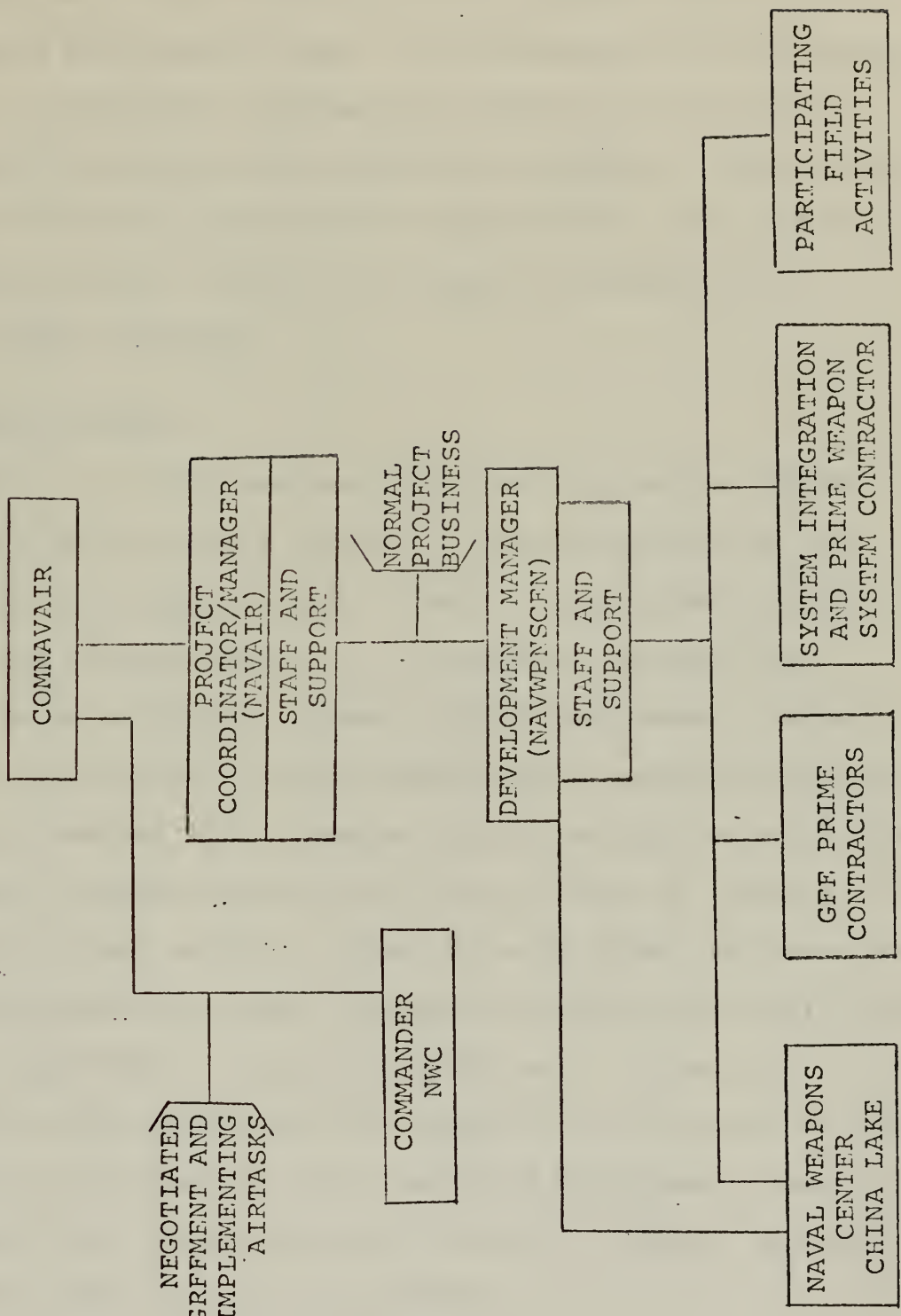
Presumably as a result of this guidance, the Assistant Secretary of the Navy for Research and Development (ASN(R&D)) released a memorandum which set forth his decision to place the management responsibility for the development of the BENDER Missile at the Naval Weapons Center:

> In consonance with the importance of this program, I desire that the BENDER Weapon System design and development through prototype test and evaluation be the direct responsibility of the Naval Weapons Center, China Lake, California. The longer term problem of pilot line and production procurement should be accomplished jointly with the appropriate CNM organization. In order to provide early attention in the Engineering Design and Development Phase to production and support requirements, the appropriate CNM personnel should be assigned to the NWC project now. The NWC will seek technical assistance from other Naval laboratories, the Office of Naval Material and contractors when and as appropriate to the program needs.
>
> The funds associated with the Design and Weapon System Development Phase will be under the fiscal management and control of the Naval Weapons Center.

Some have claimed that the Secretary's memorandum was purposely vague with respect to implementation procedures. They contend that this flexibility was essential due to the program's unusual structure and lack of precedence. Whatever the reason, ill-defined jobs breed misunderstandings and conflict. This fact was realized and an attempt to avoid this and other potential problems resulted in a letter of agreement between the Commander of NAVAIR and the Commander of Weapons Center. Exhibit (III-2) shows the management organization diagram specified by the agreement. A month later COMNAVAIR clarified this agreement with a NAVAIRNOTE

EXHIBIT (III-2)

MANAGEMENT DIAGRAM FOR BENDER GUIDED WEAPON SYSTEM



which included a revised management organization diagram, Exhibit (III-3).[4]

It was in this environment that BENDER entered the Advanced Development Phase. In accordance with the agreement, a Development Manager was appointed at NWC and a Project Coordinator was appointed at NAVAIR. Neither was given a charter nor authority commensurate with that of a project manager. Their only formal guidance was the NAVAIR-NWC Agreement.

B. CASE PROBLEM

Dr. S. F. Williams was appointed to head the BENDER Project at NWC mainly because of his background in the missile development field. (One of his earlier projects had been the RATTLER Missile.) In addition, he had much experience in private industry which was deemed a special asset in this case because BENDER was to eventually become deeply involved with a weapon system integrating contractor.

Dr. Williams saw his first job as that of organizing the BENDER Project at NWC. Since his only formal guidance was the NAVAIR-NWC Agreement he began searching his early files from the RATTLER Project for additional information. He soon realized that BENDER was not going to be as simple as RATTLER. While he was familiar with the field development concept and of the Navy's decision to try it out on BENDER, he never realized what it actually entailed.

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[4]The entire NAVAIRNOTE is included as Appendix B.

NAVAIR-NAVWPNSCEN MANAGEMENT

OF

BENDER GUIDED MISSILE WEAPON SYSTEM DEVELOPMENT PROGRAM

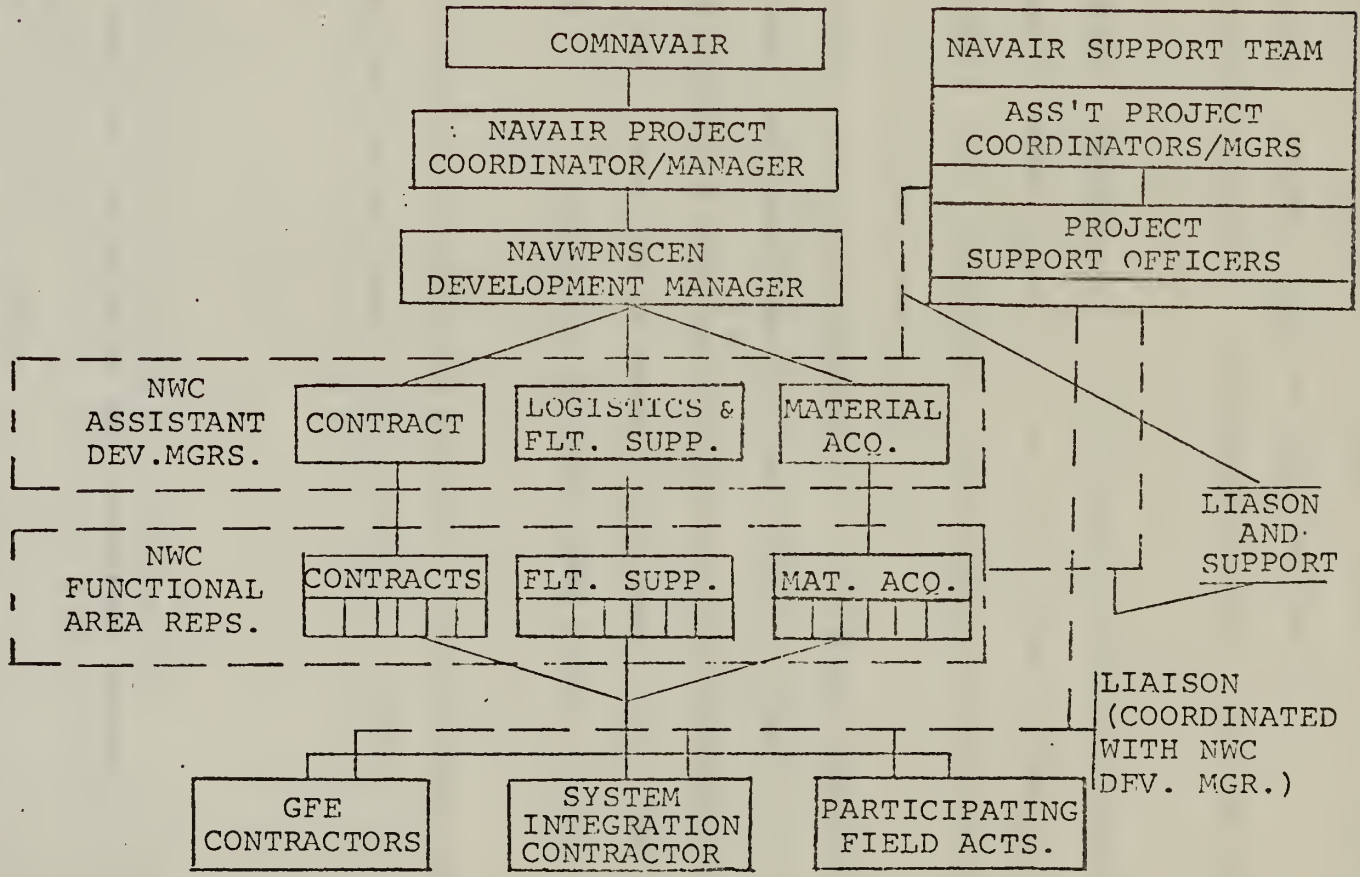

EXHIBIT (III-3)

As Dr. Williams began listing all the functions he would be responsible for he became a bit concerned. The agreement delineated those functions that would be the responsibility of the development manager at NWC and many were new to him. As he went over the agreement he began thinking out some of the functions and how he might be able to react.

1. System Definition --- No problem; just like we did on RATTLER.

2. Financial Management --- I've sent data and simple cost estimates to NAVAIR before, but this time the Project does all required cost estimating; this means control of the entire budget for BENDER rests with NWC.

3. Program Control Documentation --- I know that NAVAIR writes the Technical Development Plan (TDP) and Performance Specifications but all the real work for those documents is done here at NWC. Now the Advance Procurement Plan (APP) is something else . . . I'm going to need some help on this one.[5]

4. Contracting --- Again no problem. I've worked with the Naval Regional Procurement Office before and they're professional.

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[5]TDP - The technical roadmap for the project. It documents those actions, procedures and resources necessary to achieve the required capability and serves as a living record of plans and decisions.

APP - The financial roadmap for the project. It covers such issues as funding, methods of procurement, source competence and source selection, contract type, competition, delivery, Government furnished property, future requirements, and contract administration.

5. Industry Participation --- Now you're talking my language.

6. Data Acquisition --- This is another rough one . . . a proven prototype data package. At least this is in my area.

7. Liaison --- I've worked with the Air Force before on the RATTLER and this should be no different.

8. ILS --- Hmm . . . a good engineering problem--any engineer worth his salt automatically designs in reliability and maintainability.

9. Reporting --- Just like always--I've got to keep Washington informed.

After quite a bit of thought, Dr. Williams decided that he would not be able to manage all these additional functions and give the technical aspects of the missile development the close attention it would need. After all, the BENDER concept was pushing the "state of the art" and he could already see that there would be numerous problems to be solved. In addition "paper pushing" wasn't why he was hired. The obvious solution was to find a staff assistant or manager to handle these business/support related problems while he got on with the important job of developing the missile.

Getting the right person was no easy task since the engineers at NWC were hired for their technical expertise, not managerial ability. On the recommendation of his department head, Dr. Williams selected Joe Stern, a bright young engineer who had worked at NWC for five years and had a

reputation as one who was good at "getting things done through people." He assigned Joe as Management Programs and Plans Branch Manager as shown in Exhibit (III-4) in order to coordinate the management aspects of the project.

The next day Dr. Williams called Joe into his office and began by explaining the BENDER Project and how it fit into the Navy's plans for field development. Continuing he said,

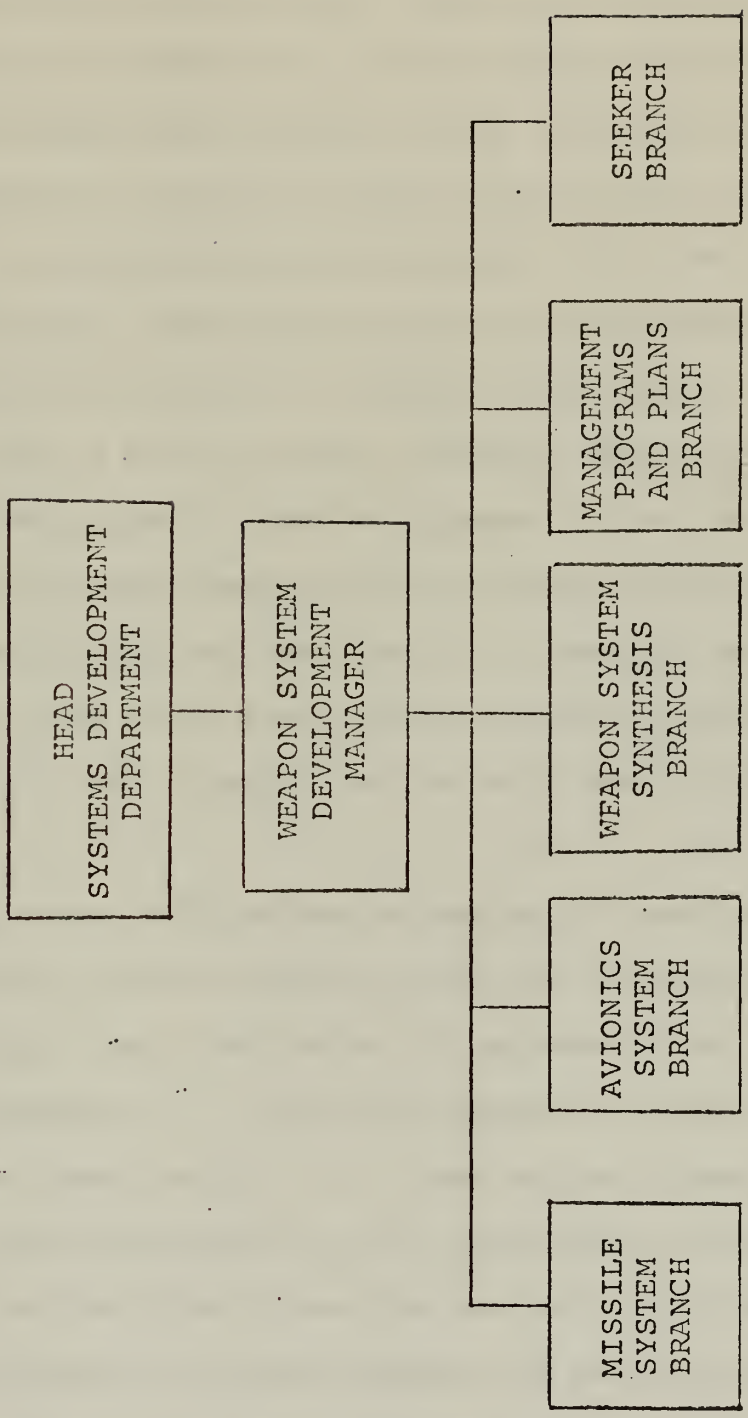
> Joe, here is a copy of an agreement worked out between ADM Holbrook at NAVAIR and ADM Stuart here at NWC concerning the operation of this project. Study it thoroughly. As you will see I have been assigned many new business/support functions which quite frankly I just don't have the time to do. Your job as Programs and Plans Branch Manager will be to coordinate these new management aspects of the project as outlined in the agreement. If you have any questions my door is always open. Good luck.

CAPT Bill Hoffman was assigned as the NAVAIR BENDER Project Coordinator. His job was to represent NAVAIR in matters dealing with NWC and also to represent the project in Washington. With respect to the latter function he would be interfacing with higher authority in the Navy, OSD, and the Congress much like other program managers. In fact, it was envisioned that he would eventually become the program manager sometime prior to the transition to production.

Unfortunately, CAPT Hoffman was not at all happy with his job as Project Coordinator, especially since he was not assigned a working staff to assist him. In the first place, the information demands on him as the sole representative of a major project on the Washington scene were overwhelming. Frequently quick reaction answers were required by higher authority. In most cases these could not be made without

EXHIBIT (III-4)

BENDER PROJECT ORGANIZATION



consultation with the project personnel at NWC. For example, BENDER was carrying on a rather extensive parallel development program in the seeker area. When the budget people wanted to know the effect of a certain dollar cut, CAPT Hoffman could not immediately reply because a decision of this magnitude depended upon which seeker development was to be terminated - a decision obviously to be made at NWC. To make matters worse, the project was not always keeping him "up to speed" with respect to project developments. In addition to this a normal project support officer organization had not developed in NAVAIR because during the period of advance development management responsibility was vested in NWC. NAVAIR personnel who needed information on BENDER soon realized that there was a communication problem and began to contact NWC directly and to rely less on CAPT Hoffman.

More than once CAPT Hoffman attempted to use authority which he did not have to force a solution to these problems. He reasoned that since the letter of agreement said, "the Development Manager . . . will be responsive to the NAVAIR BENDER Project Coordinator . . ." the Project Coordinator should have some authority over the Development Manager. In addition, he felt that since the Project Coordinator would eventually become the project manager and be responsible for the results of decisions currently being made, he should have some voice in making them.

Dr. Williams' position was simple. He was responsible for the development of BENDER and therefore he was going to "call the shots." However, CAPT Hoffman was not his only problem. Program documentation was late to nonexistent - the TDP and APP were not yet completed. A clear financial picture of the project was rarely available and Washington was constantly asking "What if" and "Howgozit" questions which Dr. Williams could not satisfactorily answer in the short time frames available.

Another aspect of the problem was developing in the minds of the Navy officials in Washington. It seemed to them that many decisions were made in light of technical evaluations without proper consideration for management implications. For example, a test program was laid out which ended with the first air-launched missile to be fired in April. After discussions with DDR&E personnel this schedule was compressed by a month so that the test results would be available for the budget justification hearings in March. Another problem was that the unit production cost of BENDER was exceeding DCP threshold. However, if the production run was large enough to include Air Force requirements this cost could be substantially reduced. In short, Navy, Air Force, and OSD officials did not have a common understanding of the total market potential for BENDER.

In response to these problems Dr. Williams began relying more and more on Joe Stern for the solutions. Frequently the answers he got were inadequate and as a result

Dr. Williams found himself getting more involved in the management aspects of BENDER. The basic problem centered around the fact that BENDER had been in Advanced Development for a year, spent more than twenty million dollars, and in the eyes of the Washington officials had little to show for it. It is not surprising then that Dr. Williams was feeling increasing pressure from these officials to get the program on the right track. Numerous briefings, which centered on the management vice technical aspects of the program, were scheduled in order to get a clearer picture of the situation. To make things even worse, BENDER fell prey to numerous budget cuts - some quite severe. This resulted in a general program stretchout of more than a year with DSARC II slipping more than six months.

It was at this point ADM Stuart decided that he and Dr. Hacker, the Technical Director at NWC, had better meet with Dr. Williams.

C. CASE DISCUSSION

1. Discuss the problems facing Dr. Williams. What recommendations would you make?

2. Evaluate the BENDER situation in terms of top management desires (SECDEF, SECNAV, and CNO), DOD Directive 5000.1, and the principles of good management. What recommentations would you make?

IV. THE BENDER MISSILE: A MANAGEMENT REVIEW CASE STUDY

A. CASE BACKGROUND

There are two primary control devices used by the Office of the Secretary of Defense (OSD) in the management of weapon system programs. They are the Defense Systems Acquisition Review Council (DSARC) and the Management Review. The purpose of these two devices is to facilitate control that is exercised by those who have approval/disapproval authority over a program and as such must be kept informed on technical progress and managerial plans. This usually means top management. But who is top management? Within the Navy the term usually is reserved for the Chief of Naval Operations or the Secretary of the Navy. At the Department of Defense (DOD) level top management usually refers to SECDEF or DEPSECDEF. It is not reasonable to expect these few top managers to be adequately informed on all aspects of each program in order to make informed decisions when they are necessary. Then how are these top managers able to control all of these various programs? Essentially they delegate the duty of keeping track of programs and making minor decisions to Assistant Secretaries of Defense or the Directors of the Departments. The Assistant Secretaries and Directors are all assisted by working staffs, Each Assistant Secretary or Director is responsible for monitoring the progress of each program that is within

his area of cognizance. The area of cognizance is determined by which phase of a program's life cycle the department is concerned. For example, the Director of Defense Research and Engineering (DDR&E) and his staff are responsible for those programs undergoing Exploratory Development, Advanced Development, and Engineering Development.

There are many techniques for controlling a program. But what is the purpose of control? At the OSD level it is to insure that the right balances are achieved between offensive and defensive weapons, that a proper technology base is present within the United States, that we maintain the right amount of Research and Development capability, plus numerous other responsibilities all of which must be accomplished within the limited available budget. It is this limited budget that necessitates much control, and the money is the means by which control is exercised. That is, control is exercised by granting or revoking funds for a program. The best ideas in the world are useless unless there are funds to develop these ideas.

The primary technique of control at the OSD level is through the DCP/DSARC process. The DCP is a summary document prepared by the DOD Component in close coordination with DDR&E and other cognizant OSD Offices. The original DCP is prepared prior to the Program Initiation DSARC and is used to condense and summarize the program objectives, plans, and parameters for the development effort. It contains milestones and thresholds on cost, performance, and schedule. The DCP

is signed by the Service after the recommendations of the DSARC are added and then forwarded to SECDEF. Once SECDEF signs the DCP it becomes the instrument by which his decision is implemented. That is, the DCP becomes a contract between OSD and the Service and as a contract requires the Service and its program to live within the DCP boundaries. For example, if the program should be in danger of exceeding its cost threshold then it is obligated to notify OSD so that the threshold may be changed or some actions to reduce cost may be made. Changes to the DCP are normally made as a result of issues brought up at later DSARCs. These changes usually take the form of a Decision Memorandum, prepared by the Service in close coordination with DDR&E, that conveys to SECDEF the recommendation to allow the program to continue with the acquisition process.

The DSARC is the principal means by which OSD gathers information in order that SECDEF may make a decision on the future of a program. A DSARC is held at three distinct points during the life cycle of a program: prior to program initiation (DSARC I), prior to the program entering Engineering Development (DSARC II), and prior to the program commencing Full Scale Production (DSARC III). Occasionally a DSARC is held just prior to a program commencing Advanced Development (DSARC IA). This occasional DSARC is used when something unusual happens during Exploratory Development and requires OSD to look into it prior to Advanced Development. Common practice is to think of the DSARC as a decision-making

board. This is not necessarily so, the DSARC is merely a prelude to a major program decision made by top management. The four members of a DSARC[1] review all aspects of the program and make a recommendation to the SECDEF. The SECDEF, or DEPSECDEF if designated, then decides if the program will be allowed to continue with the acquisition process, to do some more work in specific areas before it receives full approval for proceeding, or to be dropped entirely.

In many cases SECDEF or DEPSECDEF are unable to actively administer the proper amount of control over a program that is desired from an OSD point of view. This is especially true of the programs that are in between major decision points such as DSARCs. For programs in these phases top management usually delegates authority for control of the program to its staff, in this case elements of OSD. The Management Review is the primary means that OSD, particularly DDR&E, uses to exercise control of the program between DSARCs. Ideally, the average program will only have one Management Review during its life cycle; that usually being held within three to five months after the beginning of Engineering Development. This time is usually selected because it allows OSD to look at how initial stages of Engineering Development are

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[1]The four members of a DSARC are the Director of Defense Research and Engineering, the Assistant Secretary of Defense (Installations and Logistics), the Assistant Secretary of Defense (Comptroller), and the Assistant Secretary of Defense (Systems Analysis). Occasionally the DEPSECDEF will attend and take an active part as a fifth member of the Council. DDR&E acts as Chairman for DSARC I and DSARC II. ASD(I&L) is Chairman for DSARC III.

progressing. If they are not satisfied with the progress being made or the plans being used they are able to make changes that will have a positive effect on the program before DSARC III. Also it allows OSD to insure that the directives of top management are being complied with.

The attendees at a Management Review vary somewhat with the importance of the program and the interest within a specific department. DDR&E is specifically responsible for deciding when the review is to be held and conducting it. Notice for a review is accomplished by a memorandum from DDR&E to the Service Secretary for Research and Development. Once the memorandum reaches the Assistant Secretary it is passed down the chain-of-command until it reaches the designated program.[2] Exhibit (IV-1) is the format guide for the actual memorandum. The primary concern of this review is with various management issues; however, in the specific questions section of the review format there are usually questions dealing with areas of technical concern to the review board. The preparation for a Management Review within OSD and the Services is quite extensive. This is evident from Exhibit (IV-2) which gives an idea of some of the pre-briefings held just within OSD.

In terms of topics discussed and the material contained in the presentation there is little difference between a

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[2]Within the Navy the memorandum would normally go to the Assistant Secretary of the Navy for Research and Development, to CNO, to CNM, to a Systems Commander, and then to the program manager.

EXHIBIT (IV-1)

DIRECTOR OF DEFENSE RESEARCH AND ENGINEERING
Washington, D.C. 20301

MEMORANDUM FOR THE ASSISTANT SECRETARY OF THE (SERVICE)(R&D)

SUBJECT: Review of the Management of the (system)

Reference: ODDR&E Memo to Assistant Secretaries A/N/AF(R&D), ASD(I&L), ASD(C), Subject: Management Reviews of Major Weapon Systems -- Revised Schedule.

This memorandum is intended to provide guidance on the review of the management of (system) scheduled by reference on (date) _____, 1600, in Conference Area 1F801, Room #7. Enclosure 1 is an outline which generally describes the form and content of the management review briefing. Those specific topics unique to the management of this system should be incorporated. Enclosure 2 is a list of specific topics considered relevant to this review.* You may add others which in your judgment are also important.

Since this briefing will be classified, it is requested that the names and security clearance of personnel planning to attend be made known to our project officer, _____, Extension _____by_____1700.

DDR&E

*Enclosure 2 is not contained in this exhibit because it does not have a standardized format. The format depends upon the type of information desired.

EXHIBIT (IV-1) (Continued)

GUIDANCE FOR BRIEFING
ON
MANAGEMENT REVIEW OF THE _____SYSTEM

Make the briefing succinct. Use charts, tables, etc. wherever possible.

I. Outline Scope of Program

-Objectives
-Size and complexity
-Peculiar management needs (e.g. International aspects, Joint-Service Program)

II. Project Manager's Office (PMO) and Supporting Organizations

Describe the PMO. Typical information includes:

-- The number of personnel in the PMO (breakdown by the most important functional areas).

-- The tenure of the Project Manager (PM) and his key personnel. Summarize rank and experience of the PMO personnel.

-- Build-up and phase-out of PMO staffing.

-- Identification of the important supporting organizations (including non-Government), their functions, authorities, responsibilities and overall support provided, e.g.:

  -- Technical/Engineering
  -- Procurement and Contract Management
  -- Logistics Support
  -- Financial Management
  -- Laboratories
  -- Test Centers

Enclosure (1)

EXHIBIT (IV-1) (Continued)

III. Authority, Responsibility and Control -- Organizational Relationships

Describe the relationships between participating organizations, their authorities, responsibilities, means of management and control, e.g.:

-- Reporting relationships, e.g., to whom does PM report, how often, how directly. Why report at this level? Describe communications with top management. How many people between PM and Service Secretary on decisions?

-- Describe PM authority and control over support organizations identified in II.

-- Describe PM authority and control over the development and procurement of required GFE.

-- Describe approval authority that is exercised over the following, by whom, how this is documented, and built-in safeguards to prevent excessive optimism:

  -- Cost estimates (total and major elements and changes)

  -- Work statements

  -- Budget

  -- Procurement aspects, including contract changes

  -- Operational characteristics

  -- Schedule estimates and changes

-- Describe major limitations on the PMO's authority and the thresholds for his authority. Have these been formally established?

EXHIBIT (IV-1) (Continued)

IV. Management Planning, Systems and Control

Provide sufficient information to permit evaluation of the adequacy of management planning, systems and control. Typical information includes:

-- Major Plans (Advanced Procurement Plan, Integrated Logistics Support Plan, etc.). Who assures that they are followed, are current and are revised when necessary?

-- Formal reviews (both of contracts and of program by PM and higher authority, e.g., design review, reliability review, critical problem review, etc.). Timing? Who is responsible?

-- The various baselines (configuration, unit production cost, total cost, schedule, and operational performance). How are they established and maintained? How are predictions made?

-- The configuration management system, including the criteria for proposed changes, who does the evaluation and who makes final decisions?

Data and Management Systems

-- Principal management systems used, particularly for progress measurement, prediction, problem identification and control. Are they used by the PM? What documentation do we get? How much does it cost? Identify OSD or Service required management systems which the PM feels are not needed?

-- The key reports that are used to track cost, schedule and technical performance. How does the PM relate the work progress to the cost of work? Identify OSD or Service required reports which the PM feels are unnecessary?

-- Contract Data Requirements - efforts to keep these to the minimum necessary and to assure proper timing of data ordering or delivery - discuss use of Deferred Ordering/Deferred Delivery of data.

EXHIBIT (IV-1) (Continued)

V. Program Risks

-- Describe formal risk analysis conducted and identify the principal program and technical risks. How is program schedule tailored to the identified risks?

-- How much verification (hardware fabrication and test) is planned for the risk areas. How are these linked to the overall schedules, e.g., what releases are predicated on successful tests.

-- Show graph of schedule vs. risks and commitments.

-- What steps are being taken (e.g., back-up programs) to minimize program losses in the event of failure in areas of concern.

-- Describe any trade-offs made in performance, cost or schedule to avoid or alleviate specific risks.

-- Explain schedule and rationale for any concurring of development and production.

-- How much confidence is there in achieving the technical, operational, cost and schedule goals. Give your estimate of quantities for key operational and technical parameters, total costs, unit production cost, IOC date, etc. that will most likely be achieved?

-- Summarize DCP thresholds with current estimates and relate identified risks.

-- At what threshold in performance and cost and schedule is this not worth going ahead on.

VI. Test and Evaluation

-- Outline the overall program of test and evaluation, with emphasis on test management.

-- What problems have been encountered in keeping the test program on schedule? Has the test program been expanded or curtailed, and if so, why?

EXHIBIT (IV-1) (Continued)

-- Have test facilities been programmed ahead to meet the needs of this weapon system or equipment?

-- Is testing being conducted in a completely objective environment? To what extent has operational realism been incorporated into the test program from the outset?

-- Does the project manager or SPO have access to all test results, including contractor tests?

-- At what points in the development cycle are test results formally introduced into key program decisions? Looking ahead to the next milestone, what risks does the program face as evidenced by the testing accomplished to date?

-- Is the total test plan integrated, i.e., combines, where possible, specific tests to eliminate duplicate testing and make efficient use of facilities.

VIII. Funding/Cost Analysis

-- Summarize funding profile (by fiscal year) showing the current approved program and the current estimate for both development and production.

-- Describe independent cost analysis efforts made to validate contractor/bidder estimates and to develop funding profile.

-- Describe the process by which cost estimates are revised. Which contractor reports provide the basis for revision of cost estimates? How frequently is the total system estimate revised? If the program has CSCSC, describe how the data on the Cost Performance Report are utilized.

-- How much of budget is "held back" to fund the unexpected? How much between DCP thresholds and approved funding?

VIII. Procurement

Describe the procurement plans throughout the life cycle starting with Concept Formulation. For example:

-- The contracts that are planned, the kinds of contracts to be used and competition planned.

-- How the Government commitment and risk is minimized. How the contractor risk will be kept within reasonable limits.

-- Plan for assessing development progress and technical milestone achievement. Plan for deciding on specific procurement actions and contract options as a function of development progress and milestone achievement to reduce risks and overcommitment.

-- Production options, and the rationale for their selection and the conditions under which they can be exercised.

-- Safeguards (contractual and in-house) that exist to minimize changes and their impact. What opportunities does the contractor have to "get well" under this or follow-on contracts?

IX. Examples of Specific Problems

Provide several specific examples of problems that have arisen and how these were managed.

EXHIBIT (IV-2)

DIRECTOR OF DEFENSE RESEARCH AND ENGINEERING
Washington, D.C. 20301

MEMORANDUM FOR THE DEPUTY DIRECTOR (TWP)
DEPUTY DIRECTOR (S&SS)
DEPUTY DIRECTOR (E&IS)
DEPUTY DIRECTOR (A,E&M)

SUBJECT: Management Reviews of Major Weapon Systems

Reference: (a) DEPSECDEF Memo, Management of New Weapon Systems,

The management reviews of new weapon systems that the Deputy Secretary of Defense requested me to make in Reference (a) have started. Based upon the first full-scale review on MALLARD, it appears that the following kinds of actions are required for each briefing:

1. About one month prior to the briefing: The Deputy Director (A,E&M) should prepare a DDR&E memo to the Service providing guidance on the briefing (similar to memoranda issued on AWACS, SANGUINE, MALLARD AND SAM-D).

2. Just prior to the briefing: The Deputy responsible for the program should discuss with me the important management issues, questions to ask, etc. to prepare me for the briefing. Also provide a folder with pertinent material for my use during the briefing.

3. Immediately after the briefing: The Deputy responsible for the system needs to prepare a memorandum to the Deputy Secretary of Defense giving results of the review (evaluation of the management and management plans) and what actions, if any, need to be taken.

4. Within two weeks after the briefing: The Deputy responsible for the system will prepare a memorandum to the Service directing actions required as a result of the Management Review.

In addition, as a result of the series of briefings, some DOD-wide actions on management of major systems may be required.

It is important for everyone to recognize that the briefings by the Services are just one part of the reviews for each system. The most important part is the OSD evaluation based on the briefing and determination of the actions that need to be taken to improve the management.

DDR&E

Management Review and a DSARC. The significant difference is in the outputs of the two reviews. The Management Review does not lead to an updating of the DCP contract, and is therefore not a major decision forum. Consequently the principal members of a DSARC may or may not attend a Management Review depending upon the importance of the program undergoing the review and their specific interest in the program.

B. CASE PROBLEM

The BENDER Missile Program was never subjected to a formal DSARC I. The need for this DSARC was eliminated by the DEPSECDEF approval of the DCP that resulted from the Air Force-Navy recommendations on air-to-air missiles. Although there was not a formal DSARC it is reasonable to assume that OSD took an active part in the preparation of the recommendations and the resulting DCP and was therefore well informed about the status of the missile's development at this time. However, there were considerably strong feelings within the working staff in OSD that the lack of a formal DSARC I would almost certainly result in a DSARC IA before BENDER would be allowed to begin Advanced Development.

Slightly less than two years after the DCP was signed a meeting was held in the office of the Director of Defense Research and Engineering. Attending this meeting were six people, the Development Manager of BENDER, the Assistant Technical Director for the Naval Weapons Center, ASN(R&D), DDR&E, ASD(I&L), and DEPSECDEF. This meeting yielded a

decision to proceed into Advanced Development and approved a few minor revisions to the DCP. Since the revisions were minor the Decision Memorandum was prepared by the BENDER Program staff. When the memorandum was finished it was forwarded to DEPSECDEF who signed it.

The revised DCP still specified that the BENDER Missile should have a firing envelope somewhat greater than the improved RATTLER. It specified that the unit production cost be about the same as the improved RATTLER. It also allowed approximately two years for Advanced Development and set a threshold of $92M and a target of $77M through DSARC II. Although the new DCP was approved at the meeting, DDR&E expressed some concern about the conduct of the BENDER development and imposed a requirement for quarterly reports on the general status of the program and certain key development issues. The concern expressed by DDR&E was apparently not so much caused by the way the program was being run, but by the approach of giving NWC managerial authority over the development. This concern was primarily a reaction over public clamor about poor management of defense programs and in view of the fact that NWC was primarily technically oriented in its management philosophy.

Even at the beginning of Advanced Development some significant problems existed. Probably the most significant was the distance between NWC and Washington. This problem was further complicated by the Letter-of-Agreement between the Commander of NWC and the Commander of NAVAIR. To even

further complicate this picture the program received a substantial funds reduction just a few months after Advanced Development had begun. As a result of this Dr. Sam Williams, the Development Manager for BENDER, made a conscious decision to reduce the number of flight tests to be performed in favor of a more extensive and less expensive ground test program. Further, he was forced to substantially reduce the development effort being done on the Dynamic BENDER. He was also forced to pick the most promising seeker and guidance approach at this time and stop development of all other versions.

A short time before the actual funds reduction several events occurred that resulted in a difference of opinion as to what caused the reduction. First, NAVAIR requested that the level of effort on the Dynamic BENDER be substantially reduced. Dr. Williams, backed by NWC, refused. Shortly thereafter a request from NAVAIR to the program asked the program to specify what the impact of a funding reduction of 40% would be. Some personnel within the BENDER Program felt that the resulting funds reduction was due to the refusal by NWC to reduce the level of effort on the Dynamic BENDER. NAVAIR countered with the argument that the funds were reduced because the program was unable to adequately answer how the funds reduction would affect it.[3] A third point of view

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[3]At the time of the funding reduction the BENDER Missile Program did not have a Management Information System capable of handling this type of question. This was finally corrected shortly before the Management Review and the program can now adequately respond to these questions.

existed and was held by many at NWC and NAVAIR although it remains relatively unspoken. Many felt that the Navy needed money for another program and directed NAVAIR to reduce the funding of one of its programs. Since the money for BENDER was in-house and no outside contractor was involved and there was no contract that would have to be terminated or stretched out BENDER presented the easiest source for these funds.

To add to the woes of Dr. Williams, other problems were beginning to arise. Technically, the development of the seeker was slipping slightly behind schedule due to some unanticipated development problems. In addition, the weight of the missile was too high according to the Air Force and would severely limit their ability to load and use the missile at advanced bases. Financially, the unit production cost estimates were running somewhat higher than those specified by the DCP. And to top it all off he had just received a memorandum from NAVAIR that said that DDR&E would like to hold a Management Review in approximately a month. NAVAIR also stated that separate pre-briefings would be required to NAVAIR, NAVMAT, OPNAV, and the Secretary of the Navy.

With the actual presentation to OSD about a month away and the required pre-briefs even closer, Dr. Williams realized that the preparation of the presentation must receive his primary interest. He could see that his lack of experience in preparing for a major review of this type would be a big handicap. Fortunately he did have a retired military officer, Mr. George Lee, with Washington duty experience in the

procurement field, whom he had just appointed as the head of his Management Programs and Plans Branch. After consultation with Mr. Lee it became evident to Dr. Williams that he had an even more difficult job to do in getting ready for the presentation than originally imagined. The BENDER Program did not have direct access to the functional people in NAVAIR who in a normal program would have been the ones intimately acquainted with the program and, from experience could have picked out just the right points that would have enabled him to effectively brief higher authority. Mr. Lee also pointed out that along with limited support from NAVAIR they would also have only limited contact with OSD because of their great distance from Washington. He pointed out that it would be necessary to make use of any and all "friends of the program" available in Washington to find out if there were any hidden issues that were not brought out in the briefing guide received from OSD. Mr. Lee suggested that maybe the most appropriate place to begin the preparation was to look at any reports and briefings given to Washington personnel because this would almost certainly be the only hard facts known about the program in Washington.

Since the final briefing would be held in OSD and the pre-briefings would have to be held up the chain-of-command, Dr. Williams saw this as a possible way of getting some of the reduced funds restored, provided he used the proper approach. He realized that the proper approach was further complicated by the necessity of presenting a Navy position once he went to OSD. This meant that he would have to sell

all those who would get pre-briefs within the Navy on the need for more funds. Dr. Williams also looked at some of the decisions he had made when the funds were reduced to determine their impact upon his ability to meet the DSARC II milestones[4] and satisfy the requirements of policy directives. Major events and their relative time relationships that Dr. Williams and Mr. Lee had to consider are contained in Exhibit (IV-3). With these points and more in mind, Dr. Williams called his branch heads together and assigned them the particular points from the briefing guide that were in their areas of cognizance. The branch heads were to supply information on these areas to Mr. Lee who would be responsible for putting the presentation together.

C. CASE DISCUSSION

1. In light of DOD Directive 5000.1 what impact will the major decisions, particularly those relating to the funding reduction, have on preparation for the Management Review?

2. What are some of the major points that must be considered by the project staff in preparing for the Management Review?

D. CASE PROBLEM (Part Two)

The Management Review was held on schedule. The pre-briefs resulted in the final presentation being divided into

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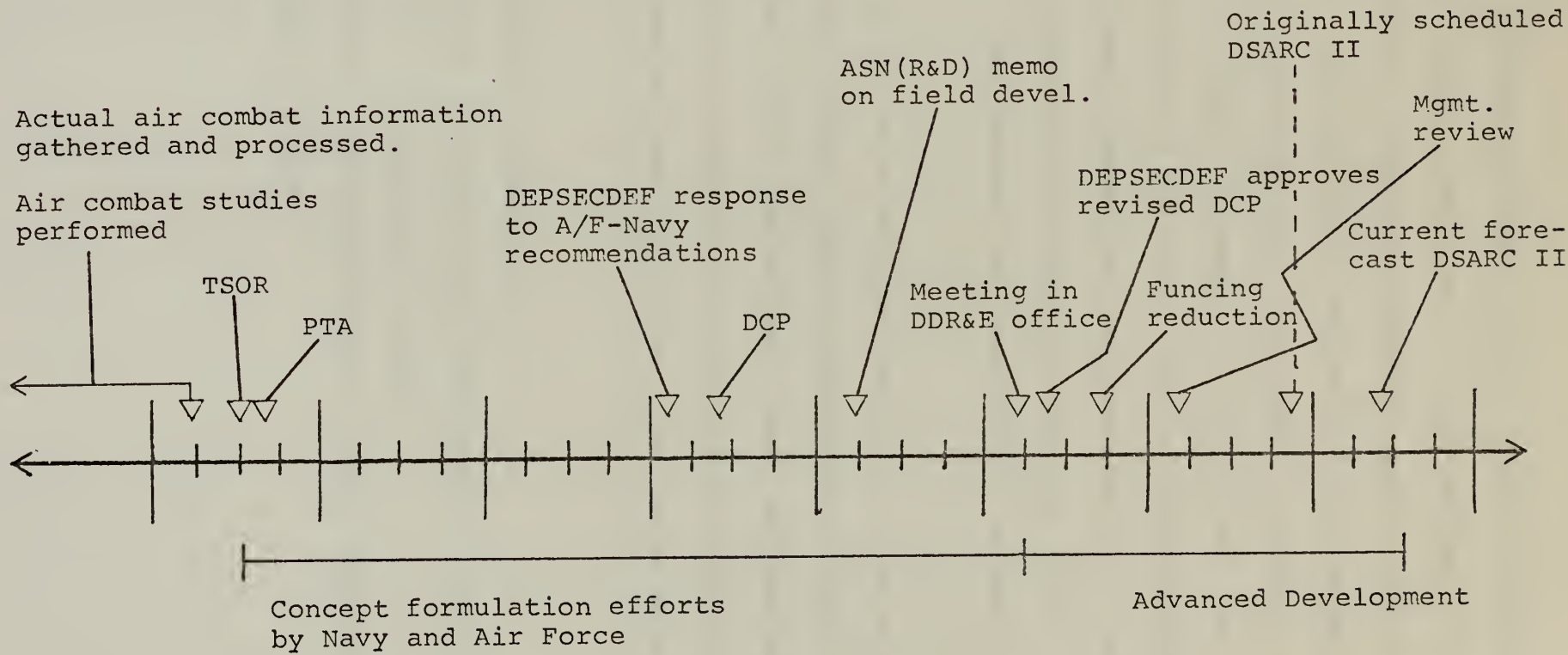
[4]The program had already received an extension of six months in DSARC II due to overall program stretchout because of the funds reduction.

EXHIBIT (IV-3)


Originally scheduled DSARC II
ASN(R&D) memo on field devel.
Mgmt. review
Actual air combat information gathered and processed.
DEPSECDEF approves revised DCP
Air combat studies performed
DEPSECDEF response to A/F-Navy recommendations
Current forecast DSARC II
TSOR
PTA
DCP
Meeting in DDR&E office
Funcing reduction
Concept formulation efforts by Navy and Air Force
Advanced Development

two parts, a management section and a technical section. The management section was given by CAPT Hoffman, the NAVAIR Project Coordinator, and the technical section was given by Dr. Williams. The Management Review was well attended with representatives from ASD(I&L), ASD(COMPT), ASD(SA), and DDR&E(T&F) plus DDR&E. Attending from the Navy were the Assistant Secretary of the Navy, Chief of Naval Material, Vice Chief of Naval Operations, representatives from OP-098 and OP-05, and the Acting Technical Director of NWC. The Air Force also had several representatives present at the Review.

Exhibit (IV-4) is an abridged version of the actual memorandum that resulted from the Management Review presentation. The only part removed were those references to specific dates and references to specifics of the missile development program that would have made the memorandum classified.

E. CASE DISCUSSION (Part Two)

1. Would you interpret this memorandum to indicate the end of the field development concept?

2. What do you think the impact of this memorandum will be on the BENDER Program?

EXHIBIT (IV-4)

THE SECRETARY OF DEFENSE
Washington D.C. 20301

MEMORANDUM FOR THE SECRETARY OF THE NAVY
SECRETARY OF THE AIR FORCE

SUBJECT: BENDER Short-Range Air-to-Air Missile; Request for Action Concerning

I have been advised of the findings of the DSARC members who met a month ago to review the BENDER management and program status. I want to reaffirm the position that, in the future, we will only develop and acquire one short-range and one medium-range air-to-air missile type for joint-service and multiple-aircraft use. While it is important that a full range of alternatives be explored prior to a decision to approve the BENDER for engineering development, there is no intention to develop or procure more than one short-range missile and one medium-range missile type.

The following actions are requested:

1. That the Navy and Air Force work together to evaluate alternative approaches to meeting the needs for a next-generation short-range air-to-air missile (SRAAM). Specifically:

   a. Differences should be resolved regarding short-range air-to-air missile performance requirements, especially as concerns missile off-boresight capability and launch weight, and a Joint Specific Operational Requirement should be prepared for the next-generation SRAAM. The JSOR should be coordinated and approved within four months to enable the evolving BENDER design to be responsive to the JSOR.

   b. The Air Force should provide full-time representation on the NWC BENDER development team and in the Office of the NAVAIR BENDER Project Coordinator as soon as possible.

   c. The Navy, as executive Service for BENDER development, should take immediate steps to establish a single focal point within the Naval Air Systems Command Headquarters who has the authority,

responsibility and accountability for BENDER development and acquisition. This office should be created and staffed within six months and should include a Deputy Program Manager for Air Force applications. The Navy has forwarded a proposed Memorandum of Understanding to the Air Force and is understood to be ready to fund all BENDER RDT&E except Air Force peculiar items (e.g. Air Force test missiles and peculiar support). The Navy and Air Force should complete action on this Memorandum of Understanding as soon as possible.

d. The Navy should increase the level of effort on alternatives other than the "baseline" design to the extent that viable alternatives exist for the DSARC to review, coupled with a reasonable level of test data to support their expected performance. In addition to the four versions presently being studied, an austere version should be investigated.

e. The results of Navy/Air Force trade-off analyses of the five potential BENDER designs should be provided to OSD for review at least six months prior to DSARC II. However, I do not view the planned DSARC II date to be constraining. If it takes a few extra weeks to do a satisfactory job of analyzing the alternatives and defining the right program, this extra time is a good investment.

2. The Navy should continue effort on both the "baseline" seeker and alternatives which offer superior counter-counter measures, with a view toward fully developing and testing both.

3. Please work with the ODDR&E Deputy Director (Test and Evaluation) to define a satisfactory T&E plan.

DEPUTY SECRETARY OF DEFENSE

APPENDIX A

NUMBER 5000.1

DEPARTMENT OF DEFENSE DIRECTIVE

SUBJECT: Acquisition of Major Defense Systems

I. PURPOSE

This Directive establishes policy for major defense system acquisition in the Military Departments and Defense Agencies (referred to as DoD Components).

II. APPLICATION

This Directive applies to major programs, so designated by the Secretary of Defense/Deputy Secretary of Defense (referred to as SecDef). This designation shall consider (1) dollar value (programs which have an estimated RDT&E cost in excess of 50 million dollars, or an estimated Production cost in excess of 200 million dollars); (2) national urgency; (3) recommendations by DoD Component Heads or Office of Secretary of Defense (OSD) officials. In addition, the management principles in this Directive are applicable to all programs.

III. POLICY

A. Mode of Operation - Successful development, production and deployment of major defense systems are primarily dependent upon competent people, rational priorities and clearly defined responsibilities. Responsibility and authority for the acquisition of major defense systems shall be decentralized to the maximum practicable extent consistent with the urgency and importance of each program. The development and production of a major defense system shall be managed by a single individual (program manager) who shall have a charter which provides sufficient authority to accomplish recognized program objectives. Layers of authority between the program manager and his Component Head shall be minimum. For programs involving two or more Components, the Component having dominant interest shall designate the program manager, and his charter

shall be approved by the cognizant official within OSD. The assignment and tenure of program managers shall be a matter of concern to DoD Component Heads and shall reflect career incentives designed to attract, retain and reward competent personnel.

1. The DoD Components are responsible for identifying needs and defining, developing and producing systems to satisfy those needs. Component Heads are also responsible for contractor source selection unless otherwise specified by the SecDef on a specific program.

2. The OSD is responsible for (a) establishing acquisition policy, (b) assuring that major defense system programs are pursued in response to valid needs and (c) evaluating policy implementation on each approved program.

3. The OSD and DoD Components are responsible for program monitoring, but will place minimum demands for formal reporting on the program manager. Nonrecurring needs for information will be kept to a minimum and handled informally.

4. The SecDef will make the decisions which initiate program commitments or increase those commitments. He may redirect a program because of an actual or threatened breach of a program threshold stated in an approved Development Concept Paper (DCP). The DCP and the Defense System Acquisition Review Council (DSARC) will support the SecDef decision-making. These decisions will be reflected in the next submission of the Program Objective Memorandum (POM) by the DoD Component.

B. Conduct of Program - Because every program is different, successful program conduct requires that sound judgment be applied in using the management principles of this Directive. Underlying specific defense system developments is the need for a strong and usable technology base. This base will be maintained by conducting research and advanced technology effort independent of specific defense systems development. Advanced technology effort includes prototyping, preferably using small, efficient design teams and a minimum amount of documentation. The objective is to obtain significant advances in technology at minimum cost.

1. Program Initiation

   a. Early conceptual effort is normally conducted at the discretion of the DoD Component until such time as the DoD Component determines that

a major defense system program should be pursued. It is crucial that the right decisions be made during this conceptual effort; wrong decisions create problems not easily overcome later in the program. Therefore, each DoD Component will designate a single individual, such as the Assistant Secretary for R&D, to be responsible for conceptual efforts on new major programs.

b. The considerations which support the determination of the need for a system program, together with a plan for that program, will be documented in the DCP. The DCP will define program issues, including special logistics problems, program objectives, program plans, performance parameters, areas of major risk, system alternatives and acquisition strategy. The DCP will be prepared by the DoD Component, following an agreement between OSD and that Component on a DCP outline. The Director, Defense Research and Engineering (DDR&E) (or the Assistant Secretary of Defense (Telecommunications) for his programs) has the basic responsibility for coordination of inputs for the DCP and its submittal to the DSARC for consideration and to the SecDef for subsequent decision. If approved, the program will be conducted within the DCP thresholds.

2. Full-Scale Development. When the DoD Component is sufficiently confident that program worth and readiness warrant commitment of resources to full-scale development, it will request a SecDef decision to proceed. At that time, the DSARC will normally review program progress and suitability to enter this phase and will forward its recommendations to the SecDef for final decision. Such review will confirm (a) the need for the selected defense system in consideration of threat, system alternatives, special logistics needs, estimates of development costs, preliminary estimates of life cycle costs and potential benefits in context with overall DoD strategy and fiscal guidance; (b) that development risks have been identified and solutions are in hand; and (c) realism of the plan for full-scale development.

3. Production/Deployment. When the DoD Component is sufficiently confident that engineering is complete and that commitment of substantial resources to production and deployment is warranted, it will request a SecDef decision to proceed. At that time, the DSARC will again review program progress and suitability to enter substantial production/deployment and forward its recommendations to the SecDef

for final decision. Such review will confirm (a) the need for producing the defense system in consideration of threat, estimated acquisition and ownership costs and potential benefits in context with overall DoD strategy and fiscal guidance; (b) a practical engineering design, with adequate consideration of production and logistics problems is complete; (c) that all previously identified technical uncertainties have been resolved and that operational suitability has been determined by test and evaluation; and (d) the realism of the plan for the remainder of the program. Some production funding for long lead material or effort may be required prior to the production decision. In such cases, the SecDef will decide whether a DSARC review and revised DCP are required. In any event, full production go-ahead will be authorized by approval of the DCP.

C. Program Considerations

1. System need shall be clearly stated in operational terms, with appropriate limits, and shall be challenged throughout the acquisition process. Statements of need/performance requirements shall be matched where possible with existing technology. Wherever feasible, operational needs shall be satisfied through use of existing military or commercial hardware. When need can be satisfied only through new development, the equivalent needs of the other DoD Components shall be considered to guard against unnecessary proliferation.

2. Cost parameters shall be established which consider the cost of acquisition and ownership; discrete cost elements (e.g., unit production cost, operating and support cost) shall be translated into "design to" requirements. System development shall be continuously evaluated against these requirements with the same rigor as that applied to technical requirements. Practical tradeoffs shall be made between system capability, cost and schedule. Traceability of estimates and costing factors, including those for economic escalation, shall be maintained.

3. Logistic support shall also be considered as a principal design parameter with the magnitude, scope and level of this effort in keeping with the program phase. Early development effort will consider only those parameters that are truly necessary to basic defense system design, e.g., those logistic problems that have significant

impact on system readiness, capability or cost. Premature introduction of detailed operational support considerations is to be avoided.

4. Programs shall be structured and resources allocated to ensure that the demonstration of actual achievement of program objectives is the pacing function. Meaningful relationships between need, urgency, risk and worth shall be thereby established. Schedules shall be subject to trade-off as much as any other program constraint. Schedules and funding profiles shall be structured to accommodate unforeseen problems and permit task accomplishment without unnecessary overlapping or concurrency.

5. Technical uncertainty shall be continually assessed. Progressive commitments of resources which incur program risk will be made only when confidence in program outcome is sufficiently high to warrant going ahead. Models, mock-ups and system hardware will be used to the greatest possible extent to increase confidence level.

6. Test and evaluation shall commence as early as possible. A determination of operational suitability, including logistic support requirements, will be made prior to large-scale production commitments, making use of the most realistic test environment possible and the best representation of the future operational system available. The results of this operational testing will be evaluated and presented to the DSARC at the time of the production decision.

7. Contract type shall be consistent with all program characteristics including risk. It is not possible to determine the precise production cost of a new complex defense system before it is developed; therefore, such systems will not be procured using the total package procurement concept or production options that are contractually priced in the development contract. Cost type prime and subcontracts are preferred where substantial development effort is involved. Letter contracts shall be minimized. When risk is reduced to the extent that realistic pricing can occur, fixed-price type contracts should be issued. Changes shall be limited to those that are necessary or offer significant benefit to the DoD. Where change orders are necessary, they shall be contractually priced or subject to an established ceiling before authorization, except in patently impractical cases.

8. The source selection decision shall take into account the contractor's capability to develop a necessary defense system on a timely and cost-effective basis. The DoD Component shall have the option of deciding whether or not the contract will be completely negotiated before a program decision is made. Solicitation documents shall require contractor identification of uncertainties and specific proposals for their resolution. Solicitation and evaluation of proposals should be planned to minimize contractor expense. Proposals for cost-type or incentive contracts may be penalized during evaluation to the degree that the proposed cost is unrealistically low.

9. Management information/program control requirements shall provide information which is essential to effective management control. Such information should be generated from data actually utilized by contractor operating personnel and provided in summarized form for successively higher level management and monitoring requirements. A single, realistic work breakdown structure (WBS) shall be developed for each program to provide a consistent framework for (a) planning and assignment of responsibilities, (b) control and reporting of progress, and (c) establishing a data base for estimating the future cost of defense systems. Contractor management information/program control systems, and reports emanating therefrom, shall be utilized to the maximum extent practicable. Government imposed changes to contractor systems shall consist of only those necessary to satisfy established DoD-wide standards. Documentation shall be generated in the minimum amount to satisfy necessary and specific management needs.

IV. IMPLEMENTATION

1. Each DoD Component will implement this Directive within 90 days and forward two (2) copies of each implementing document to the SecDef.

2. The number of implementing documents will be minimized and necessary procedural guidance consolidated to the greatest extent possible. Selected subjects to be covered by DoD Directives/Instructions or joint Service/Agency documents in support of this Directive are listed in Enclosure 1. Each DoD Component will forward the joint Service/Agency documents for which it is responsible to the SecDef for approval prior to issuance.

Enclosure
Related Policy

Deputy Secretary of Defense

APPENDIX B

DEPARTMENT OF THE NAVY
Naval Air Systems Command
Washington, D.C. 20360

NAVAIR NOTICE

From: Commander, Naval Air Systems Command

Subj: BENDER Weapon System Development Project; special management disciplines pertaining to

Ref: (a) ASN(R&D) conf Memorandum for Chief of Naval Operations and Chief of Naval Material

Encl: (1) COMNAVAIR - COMNAVWPNSCEN Agreement concerning the Advanced Development and Prototype Test and Evaluation Programs for BENDER Guided Weapon System
(2) NAVAIR - NAVWPNSCEN Management of BENDER Guided Weapon System Development Program.

1. Purpose. The purpose of this notice is to:

a. Implement reference (a)

b. Distribute enclosure (1)

c. Establish NAVAIRSYSCOM policy with respect to conduct of the BENDER Advanced and Engineering Development Programs

d. Provide guidance and direction to insure compliance with the spirit and intent of reference (a).

2. Background

a. By reference (a) ASN(R&D) expressed the "desire that BENDER Weapon System design and development through prototype test and evaluation be the direct responsibility of the Naval Weapons Center, China Lake" and that the funds associated with that effort be placed under the Center's "fiscal and management control." Reference (a) further stated that the longer term problem of pilot and follow-on procurement "should be accomplished jointly with the appropriate CNM organization."

b. A fuller understanding and clarification of the intent of reference (a) was achieved through follow-up discussions with ASN(R&D) and his staff. Following those discussions COMNAVAIR negotiated and signed an agreement with COMNAVWPNSCEN concerning management of the Advanced and Engineering Development phases of the BENDER program. The signed agreement has been approved by Chief of Naval Material and ASN(R&D). This Agreement, inter alia, provides for the establishment of a NAVAIR BENDER Project Office and the designation of a NAVWPNSCEN Development Manager. A copy is provided herewith as enclosure (1).

3. Policy

a. No action shall be taken by any individual or activity in NAVAIR-SYSCOM (Naval Air Systems Command) which contravenes the agreements set forth in enclosure (1).

b. Within the limits of resources made available and the priorities assigned, all elements of NAVAIRSYSCOM shall render full support to the NAVAIR BENDER Project Coordinator/Manager and the NAVWPNSCEN BENDER Project organization.

4. Discussion and Guidance

a. In the discussions with ASN(R&D) and his staff the intent of reference (a) was established as requiring that NAVAIR make an assignment of responsibility and delegation of authority to NAVWPNSCEN such that NAVWPNSCEN could have the greatest possible technical and management flexibility and control in conducting the Advanced and Engineering Development phases of the BENDER program. It should be noted that although this assignment of responsibility and delegation of authority closely resembles some of the earlier guided missile and conventional weapon system developments in which NAVWPNSCEN participated in the role of Leading Field Activity, there is nevertheless a very important difference. Under this new BENDER project management concept which is organizationally depicted in enclosure (2), the NAVWPNSCEN project organization, in the person of the Development Manager, will be responsible directly to the NAVAIR BENDER Project Coordinator/Manager for the technical and administrative aspects of the development program rather than through the normal structure of NAVAIR Assistant Project Coordinators/Managers and Project Support Officers. The net effect so far as the technical aspects of the program are concerned is that all technical direction relating to the BENDER Weapon System will be internally generated within the NAVWPNSCEN project organization.

b. This is not to say, however, that Headquarters Groups and Division personnel should not be involved in these early phases of the BENDER development program. On the contrary, it is emphasized that NAVAIR is now and will remain responsible for the development, production and support of the BENDER Weapon System and that the reassignment of portions of that responsibility and delegation of related authority to NAVWPNSCEN will in no way relieve NAVAIR and the Headquarters Project Coordinator/Manager of his line responsibility for assuring compliance with the program directives, requirements and thresholds promulgated by higher management echelons. To discharge this essential Headquarters responsibility, maintain the required visibility into the status of the ongoing program and perform the unique Headquarters functions as well, he will need the assistance of an alert, Headquarters project support team.

c. During the period when NAVWPNSCEN is directing the design and development effort, the Headquarters team of Assistant Project Coordinator/Managers and their PSO support groups will serve in a staff capacity to the NAVAIR Project Coordinator/Manager and assume the role of consultants to rather than directors of, the NAVWPNSCEN Development Management Team. Acting in this consultant capacity they will be expected to establish liaison with their counterparts on the Development Manager's team and offer constructive criticism where and when appropriate, at the same time being careful to refrain from attempting to force or unduly influence technical decisions that are in fact within the purview of the responsible NAVWPNSCEN Development Manager. Decisions concerning the assigned development phases must, in the final analysis, be those of the NAVWPNSCEN Development Manager if, as desired by ASN(R&D), the Center is to have an opportunity to successfully discharge the direct responsibility assignment. There should be no hesitancy, however, on the part of any NAVAIR team member to advise the responsible Assistant Project Coordinator/Manager or the Project Coordinator/Manager, as appropriate, whenever the course of action directed by the NAVWPNSCEN Development Manager is judged to be contrary to the approved control documents called out in the enclosure (1) Agreement or to the Agreement itself; or whenever, in his opinions, such action would result in an unacceptable product, be incompatible with carrying aircraft systems or make it difficult or impossible for the Headquarters team to execute the pilot and follow-on production program under normal management procedures.

5. Action

a. AIR-03

(1) Establish a BENDER Project Office and appoint a BENDER Project Coordinator (PC) to serve as the primary contact for and perform the Headquarters management function for the BENDER Advanced Development Program.

(2) In collaboration with NAVWPNSCEN, prepare and issue a mutually accaptable AIRTASK which assigns responsibility and delegates authority commensurate therewith for accomplishment of the BENDER Advanced Development Program.

b. AIR-01: When directed by AIR-00 (for planning purposes not later than six to nine months prior to the first scheduled DSARC), initiate action to charter a NAVAIR Designated Project for BENDER, provide for a project office and designate a BENDER Project Manager (PMA).

c. AIR-05: In collaboration with NAVWPNSCEN, prepare and issue a mutually acceptable AIRTASK which assigns responsibility and delegates authority commensurate therewith, for accomplishment of appropriate phases (at least through prototype test and evaluation) of the BENDER Engineering Development Program.

d. AIR-02, AIR-04, AIR-05: Designate to the AIR-03 PC (Project Coordinator) and the AIR-01 PMA (Project Manager) (see a. and b. above) Assistant Project Coordinators/Managers and PSO (Project Support Officer) teams as necessary to provide Headquarters staff support for the performance of essential Headquarters project coordination/management functions.

Commander Naval Air Systems Command

COMNAVAIR - COMNAVWPNSCEN Agreement Concerning the Advanced Development and Prototype Test and Evaluation Programs for BENDER Guided Missile Weapon System

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Ref: (a) ASN (R&D) Conf memo to CNO and CNM of 26 April 1971

In keeping with the spirit and intent of reference (a), Commander, Naval Air Systems Command will assign responsibilities and delegate authority to Commander, Naval Weapons Center for the management and conduct of the Advanced Development and Prototype design test and evaluation phases of the BENDER Weapon System.

The purpose of this agreement is to establish the framework of understanding within which the project effort will be conducted.

SYSTEM DEFINITION

The BENDER Guided Missile Weapon System for which NAVWPNSCEN will be assigned development management responsibility includes but is not limited to the following:

1. Expendable Items

    a. Missile

        (1) Airframe
        (2) Guidance
        (3) Controls
        (4) Warhead
        (5) Fuze
        (6) Motor

2. Non-Expendable Items

    a. Visual target acquisition system
    b. Other Weapon Control System Elements not designed and provided as an integral part of the using aircraft.
    c. Launcher (if new development required)
    d. Peculiar Ground Support Equipment

        (1) For missile
        (2) For Non-expendable system elements

    e. Aircraft Modification Kit

Enclosure (1)

PROJECT MANAGEMENT

NAVAIR will establish a BENDER Project Office as the primary point of contact in the Naval Material Command for the conduct of BENDER business. NAVWPNSCEN will designate a Development Manager resident at NAVWPNSCEN who will be responsive to the NAVAIR BENDER Project Coordinator or Manager as appropriate under the terms of this agreement (Figure I applies).

LONG RANGE PLANNING

Data required for broad BENDER planning, such as included in the Navy Strategic Study, tentative Program Objectives Memorandum, Weapon System Planning Documents, Material Planning Studies, etc., will be coordinated by NAVAIR. NAVAIR will provide such long range planning information as may be required by NAVWPNSCEN and solicit support as may be required for proper planning.

BUDGET PREPARATION AND PROJECT FUNDING

NAVWPNSCEN will have financial management responsibilities for those portions of the program for which responsibility has been assigned and will provide necessary data and cost estimates for its assigned responsibilities to NAVAIR for program, budget and review purposes. NAVAIR will have financial management responsibility for the overall BENDER Weapon System Project.

NAVAIR will prepare, review, justify and defend programming, budget and apportionment estimates for the total BENDER Program. As appropriate and required, NAVWPNSCEN representatives will be called upon to supply data and provide back-up witnesses.

The entire amount of project funds required and apportioned for support of the NAVWPNSCEN effort previously agreed to by both parties and expressed in the current version of the development plan will be made available to NAVWPNSCEN in a single funding document issued by NAVAIR each year at the time of apportionment.

Enclosure (1)

PROGRAM CONTROL DOCUMENTATION

NAVWPNSCEN will be responsible for the preparation and updating of the following essential documents:

(1) The Technical Development Plan (Adv. Dev.) - (Applicable to Concept Formulation (Validation) effort and Engineering Development Planning).

(2) The Technical Development Plan (TDP) - (Applicable to Engineering Development. One of the major outputs of the Advanced Development Program).

(3) The Advanced Procurement Plan (APP) - (Covers all contemplated contractual actions for the entire program span up to and including first competitive reprocurement or first volume procurement, whichever is sooner).

(4) The Performance Specification - (Performance specifications for the system, major subsystems and elements of the system to be developed and prototyped as GFE items are required as an output of the Validation effort and prior to release to prototype procurement).

(5) The Development Concept Paper - (Draft and review as required).

The above items will be prepared by NAVWPNSCEN and submitted through NAVAIR and updated on a timely basis. Items 1, 2, 3 and 4 are subject to NAVAIR concurrence or approval as appropriate. All items will be used as program control documents.

Requirements for the preparation of these documents will be delineated in the applicable AIRTASK assignments.

INDUSTRIAL PARTICIPATION

Developments of hardware or software for service use, beginning with the prototype program will be accomplished by NAVWPNSCEN or participating field activities working with and through industrial concerns capable of producing the quality and quantity of hardware needed for service use, at the desired rates. This industrial participation will be such that at the initiation of the prototype phase one of the participants can be designated as the weapon system or system integration contractor who, under the technical direction of NAVWPNSCEN, will:

INDUSTRIAL PARTICIPATION (Cont'd)

(1) evolve the production baseline configuration of the so-called contractor furnished portions of the weapon system.

(2) Participate in the performance of the system integration function by assisting in the development, establishment and management of total system configuration and the maintenance of CFE-to-GFE and weapon system-to-aircraft and carrier interfaces. The items of equipment and software to be developed as GFE will be determined by NAVWPNSCEN and treated appropriately in the APP. The number of such items will be held to a practical minimum.

CONTRACTING

Contracting for all procurements undertaken in support of the development program through the prototype phase will be accomplished by NAVWPNSCEN using procedures and contracting offices of their own choosing. Source selection will be accomplished by NAVWPNSCFN in accordance with CNM approved procedures. Final selection of contractors for prototype production must be concurred in by NAVAIR before announcement. A designated representative of the NAVAIR Project Coordinator/ Manager will participate in all selections of prototype equipment contractors as a member of the source selection evaluation board or its equivalent.

DATA ACQUISITION

The end product of the NAVWPNSCEN-managed development program will be a proven prototype data package which will provide for or support

a. A release to Pilot Production by the Prototype contractor
b. Inspection and acceptance of pilot production end items
c. Installation in test and evaluation aircraft
d. Operation by test and evaluation personnel
e. Maintenance and repair by Navy test and evaluation organizations

The NAVAIR Project Coordinator/Manager will validate this data package through in-process reviews.

Enclosure (1)

CONFIGURATION CONTROL

Configuration Control for the advanced development period will be against the stated objectives of the ADO (Advanced Development Objective). For the early engineering development period beginning with prototype procurement and extending to the point of release to pilot production or delivery of first hardware for NTE, whichever is sooner, control will be against the performance specification or functional baseline established in the advanced development (validation) program. The configuration control for pilot production will be against the product baseline disclosure provided in the release to pilot production. Deviations from the baseline configurations delineated above will require the prior approval of the NAVAIR Project Coordinator/Manager.

LIAISON

a. Intro-Project Liaison. All visits to participating field activities and contractors by personnel other than those reporting directly to the NAVWPNSCEN Development Manager will be coordinated with the NAVWPNSCEN Development Manager prior to their occurrence.

b. Inter-Service Technical Liaison. The NAVWPNSCEN Development Manager will conduct direct liaison with the Air Force on technical matters and will provide facilities for local Air Force liaison and/or technical representatives. All project action requirements levied upon the Air Force in the course of this development will be implemented with the concurrence of the NAVAIR Project Coordinator/Manager.

c. Liaison with Higher Authorities. NAVAIR will provide primary liaison with CNM, OPNAV, SECNAV, OSD and Congress relative to management of, and progress reporting on the BENDER Project. The NAVWPNSCEN Development Manager will be called upon to supply information and provide back-up support. He will provide technical presentations, as appropriate.

d. Liaison with Aircraft and Related Equipment Contractors. The NAVAIR Project Coordinator/Manager will arrange for access of appropriate NAVWPNSCEN Project personnel to NAVAIR contractors for aircraft and related equipment and will take all steps necessary to assure early detection of compatibility problems and their expeditious resolution.

Enclosure (1)

COST ESTIMATING

The NAVWPNSCEN Development Manager will prepare and keep current, a detailed cost estimate for the complete development, test and evaluation program and will assist NAVAIR in the generation and update of production cost estimates. The cost model used for these estimates will be worked out in conjunction with and approved by the NAVAIR Project Coordinator/Manager.

INTEGRATED LOGISTICS SUPPORT

The NAVWPNSCEN Development Manager will coordinate all logistic support management planning and implementation with NAVAIR based on the procedures of NAVAIR Instruction 4000.2. He will provide a cochairman for the ILSMT (Integrated Logistics Support Management Team) constituted by NAVAIR.

CORRESPONDENCE

The NAVWPNSCEN Development Manager will provide the NAVAIR Project Coordinator/Manager with copies of pertinent correspondence between and among participating field activities, contractors and the Development Manager. The NAVAIR Project Coordinator/Manager will provide the Development Manager with correspondence and reports judged to be useful and/or desirable to the Development Manager.

REPORTING

a. Routing. A systematic, periodic reporting method will be established by the NAVWPNSCEN Development Manager to indicate progress of the BENDER development program in relation to the pre-established technical, fiscal and schedule milestones. Insofar as possible, such reports will be those used by the Development Manager.

b. Special. Special reports will be needed by the NAVAIR Project Coordinator/Manager from time to time to meet special requirements. Such reports will be provided by the NAVWPNSCEN Development Manager on a mutually agreed upon basis.

c. Technical. Periodic technical reviews will be scheduled by the NAVWPNSCEN Development Manager at least every fourth month at which time the technical status of the program will be discussed in detail. The NAVAIR Project Coordinator/Manager and selected members of his Headquarters staff will attend these meetings.

Enclosure (1)

Commander, Naval Wespons Center	Commander, Naval Air Systems Command

APPROVED:

Chief of Naval Material	Assistant Secretary of the Navy (R&D)

Enclosure (1)

MANAGEMENT DIAGRAM FOR BENDER GUIDED WEAPON SYSTEM

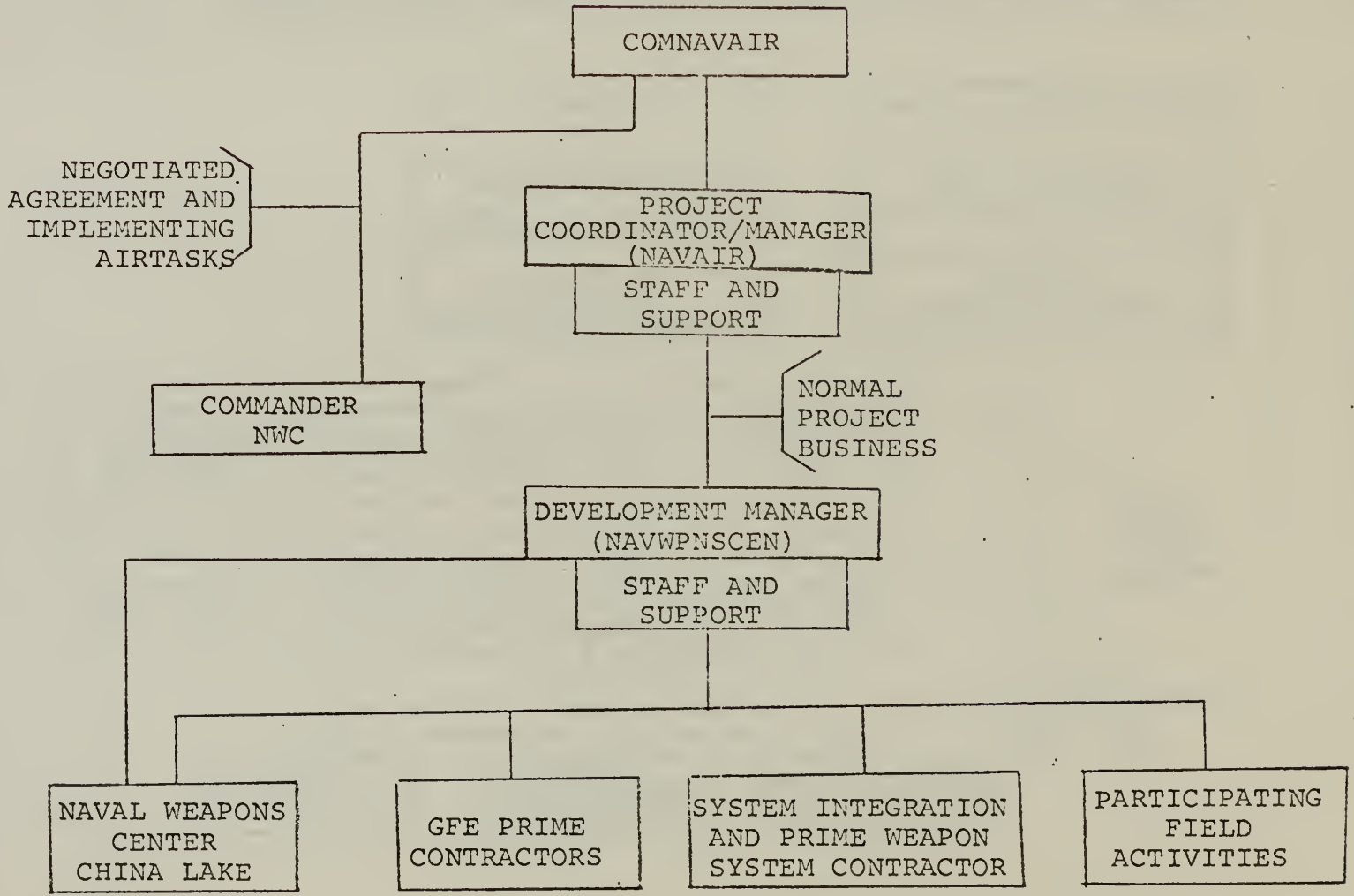

EXHIBIT (III-2)

NAVAIR-NAVWPNSCEN MANAGEMENT
OF
BENDER GUIDED MISSILE WEAPON SYSTEM DEVELOPMENT PROGRAM

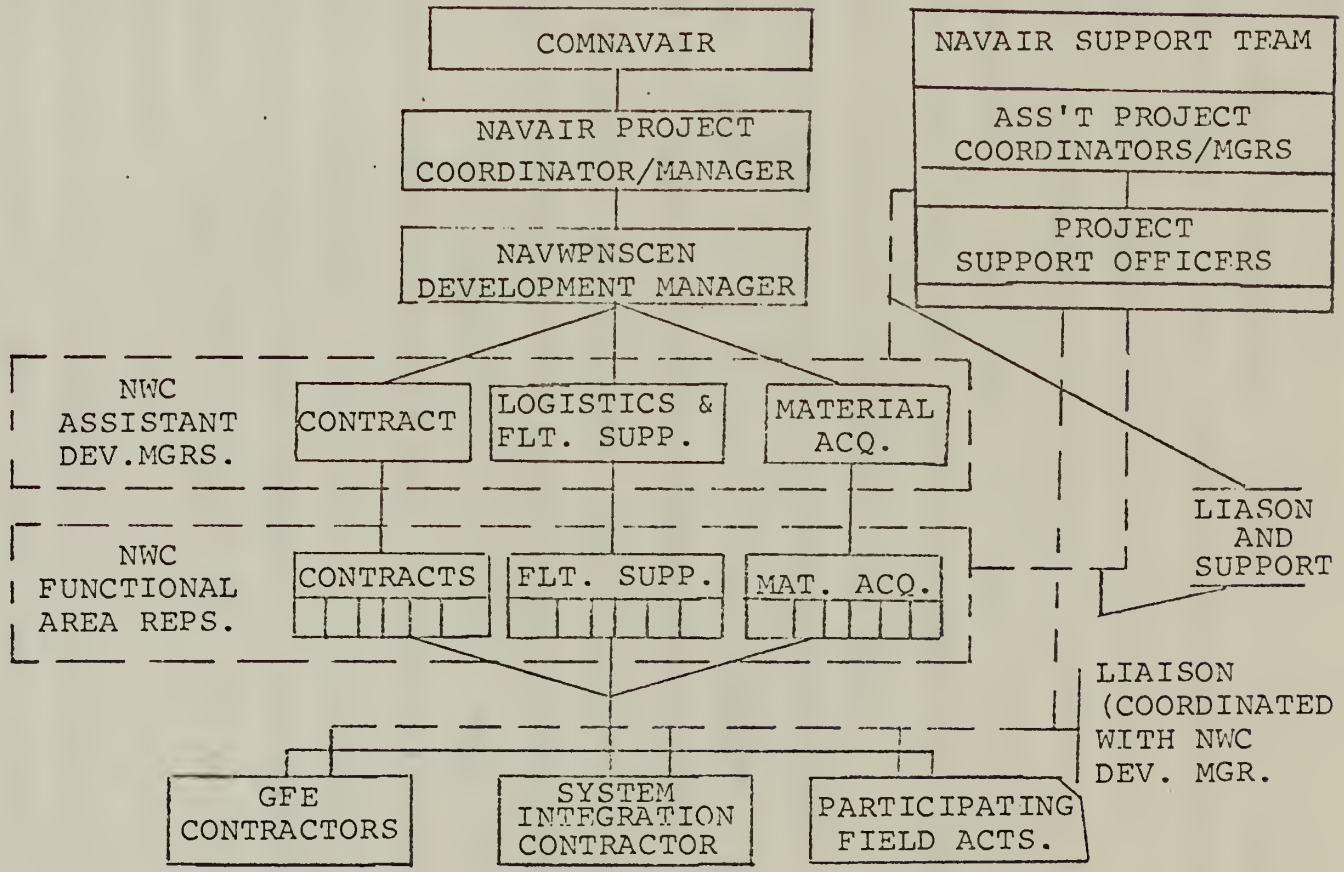

EXHIBIT (III-3)

APPENDIX C

TEACHING COMMENTARY

A. INTRODUCTION

In order to obtain the greatest benefit from the BENDER Cases, the student should have a general familiarity with the system life cycle, DOD System Acquisition Process, DOD Directive 5000.1, and the basic principles of good management. This knowledge not only aids the student in following the scenario, but also gives him a good reference for analyzing the problems interspersed throughout the cases.

The field development concept is an underlying issue throughout both cases. It is the root of the problem in the Organizational case and its possible termination is the result of the Management Review case. What is field development? How does it differ from the normal project management concept? Is it a valid concept for the future? These are important questions that students might ask while digging into the issues of both cases. There is no single answer to any of these questions, but an understanding of the field development concept is important to grasp the underlying issues of both cases.

In general terms field development is a decentralized form of project management in which a field activity has direct responsibility for the development of a specific weapon system. In order to better understand the implications

of this, a comparison will be made between the field development concept and the normal development concept.

In a normal systems command/field activity project a dual organization is formed - one at the field activity and one at the systems command. The systems command project organization includes the project manager and his project officers. In most cases the project manager makes all the major decisions while the project support officers direct project work in their area of expertise - contracts, material acquisition, and logistics. Under the field development concept there are two major differences. First, the authority and responsibility of project management is vested in the development manager at the field activity and secondly, the project support groups assume the role of consultants to rather than directors of the field activity development management team. It is important to remember that in either case the technical job of weapons system development is accomplished at the field activity and thus, field development simply means that the field activity has management as well as technical responsibility for the program.

Another issue pertinent to both cases is the management capability within the Navy Laboratory system. Of the many reasons put forth for field development, many contend that one of the main reasons is to increase the management capability within the laboratories. The instructor may find that the class is divided in its faith in the field development concept. Much of this difference of opinion may center

around the management capability of the Navy Laboratory system being largely untested. Those in favor of field development will probably restate many of the reasons brought out in the Organizational Case to support their arguments while those against may bring up the existence of a proven source of management capability within the systems commands. Those against may also point out that the Navy may not be able to afford such a duplication of resources in the future. What ever the point of view it is necessary to look at some alternatives: that is, move all programs to the field and eliminate much of the systems commands bureaucracy, eliminate field development, or some other approach. From an academic standpoint many things are possible. What the students should consider is whether or not the alternative is viable in the "real world."

B. ORGANIZATIONAL CASE DISCUSSION

The instructor may desire to discuss this question after both cases have been presented since additional problems are developed in the Management Review Case.

1. Discuss the problems facing Dr. Williams. What recommendations would you make?

The basic problem facing Dr. Williams is that he is an engineer and not a trained manager. As a result, his views of project management (scope and depth) are obviously biased. He attacks the management problems like the engineering problems - find a good man and assign him to work on it. Unfortunately effective management does not work that way. It

cannot be delegated and must be practiced at all levels within the project. As far as Dr. Williams is concerned, he should select a deputy development manager with management expertise to complement his own weaknesses in this area. Probably this was part of his motive in selecting Joe Stern as his Management Programs and Plans Branch Manager. Unfortunately Joe was assigned at too low a level in the project to be effective and in addition, it seems that he also was more of an engineer than a manager. Whether or not this is true, the fact still remains that he has not done his job effectively and must be replaced. A workable solution would be for Dr. Williams to have a deputy to assist him and a branch manager to handle such matters as program documentation and financial management.

Another problem facing Dr. Williams is the lack of a project information system. Basic to this is a meaningful work breakdown structure with appropriate cost and schedule budgets for each work package. While Dr. Williams may feel confident that his engineers are cost conscious, this will not satisfy Washington - they must have the facts. In developing this information system Dr. Williams must impress upon his engineers the importance of their data as inputs. In the past they have felt any such effort was a waste of time; however, a key to selling the program in Washington is timely accurate information.

Dr. Williams reports two levels below the station technical director in the NWC organization. While BENDER is not a

designated NAVAIR Project, it is a major DOD Program in the sense of DOD Directive 5000.1. When project personnel were asked about this they felt it was not a serious problem in light of the informal environment at NWC and especially considering all the attention provided by the Technical Director. Hopefully a change in technical directors will not alter this policy; however, the question of the project manager having direct access to top management remains.

Obviously the most pressing problem facing Dr. Williams is that BENDER is not presenting a united front in Washington. He and CAPT Hoffman are not working well together and quite simply the program is suffering because of inadequate representation to top management. In fact is seems reasonable to assume that many of Dr. Williams' problems with Washington could have been avoided or at least reduced had the development manager and the project coordinator been working as a team from the beginning. A good example would be the numerous budget cuts suffered as a result of top management frustration with the BENDER Program. The time is at hand for Dr. Williams to "bite the bullet" and work out a solution with CAPT Hoffman. In essence, the project coordinator must quit trying to run the program and in return the project must make a concerted effort to keep him "up to speed" on the latest developments. If this approach proves infeasible Dr. Williams should solicit help from ADM Stuart and the upcoming meeting might be a good opportunity for this.

2. Evaluate the BENDER situation in terms of top management desires (SECDEF, SECNAV, and CNO), DOD Directive 5000.1, and the principles of good management. What recommendations would you make?

The present situation is the result of ineffective decentralization. On the one hand top management sees decentralization as a way for better system acquisition and on the other hand NAVAIR is the typical manager reluctant to delegate. The reasons for decentralization and thus the field development concept have been discussed earlier in the case problem and will not be repeated here. In analyzing NAVAIR's reluctance to decentralize it is important to keep in mind that prior to the reorganization in 1966 the system commands had chain-of-command authority over their cognizant field activities. Since then they have taken on a customer relationship and now through field development are being ordered to let the laboratories have the "whole ball of wax,"while they still retain the overall responsibility for the acquisition of the weapon system. In addition, the laboratories have simply not had program management experience in terms of major systems acquisition. At this point the problem for the laboratories is all too familiar: "You cannot have the job until you get the experience and you cannot get the experience without the job."

It was in this environment that the NAVAIR-NWC implementing agreement was written. Its drafters maintain that it is vague and ambiguous of necessity to allow the parties latitude

within which to work. However, another possible argument is that it was written to satisfy the desires of the endorsers (ASN(R&D), NAVMAT, COMNAVAIR, and COMNAVWPNSCEN). This latter thought becomes more convincing when the agreement is read in light of the decentralization principle of functional definition. It simply says that individuals do a better job when they have a clear understanding of results expected, activities to be undertaken, and organizational authority delegated. These ideas are in agreement with DOD Directive 5000.1 which states that "Key factors in successful system acquisition are competent people, rational priorities and clearly defined responsibilities." In addition the directive requires that acquisition programs be managed by a single individual with sufficient authority to do the job. The other pertinent provisions of the directive apply equally well and were previously mentioned in the case problem.

While the effectiveness of the implementing agreement can be argued with varying degrees of success, that is not the point. The job is to develop a missile system within the guidelines laid down by ASN(R&D) and any resultant situation contrary to this requires change. The big problem seems to be the project coordinator and his relationship with the BENDER project organization. NAVAIR's position is clear - they need some form of control over BENDER and CAPT Hoffman is it. Unfortunately, according to the management diagram shown in the case problem, this amounts to one man (the Development Manager) reporting to one man (the Project

Coordinator). This seldom works out unless one is subordinate to the other as in a Commanding Officer/Executive Officer relationship and this is definitely not the case with Dr. Williams and CAPT Hoffman. Clearly the arrangement is too dependent upon personalities and no organization can operate effectively in this environment. In addition, control of a major program from 3000 miles is difficult to impossible for one man. Of the many alternatives, three seem to stand out as being the most workable. The first is to eliminate the job of project coordinator and assign a project manager from NAVAIR to head the development effort at NWC with the development manager as his assistant. The second is to clarify the project coordinator's authority and relationship with the development manager. This would include providing him with a staff and the development of a project support officer organization within the various functional groups at NAVAIR. The final alternative is to discontinue the field development concept as far as BENDER is concerned.

C. MANAGEMENT REVIEW CASE DISCUSSION

Part One

1. In light of DOD Directive 5000.1 what impact will the major decisions, particularly those relating to the funding reduction, have on preparation for the Management Review?

From the case the student might pick up an idea that the upcoming Management Review may in fact be more than a Management Review. It is possible that in getting the decision to proceed into Advanced Development in the manner they did,

BENDER may have created a situation on the DDR&E Staff and within other department staffs in OSD in which people are somewhat unhappy with BENDER. This brings up the point of what type environment will BENDER be giving this presentation.

After considering the environment Dr. Williams and Mr. Lee must consider the impact of decisions made as a result of the funding reduction. For example, is the decision to pick one guidance/seeker approach contrary to DOD Directive 5000.1's intent of carrying alternatives for high risk components? From various comments within the case it should be possible for the student to recognize that the guidance/seeker unit is indeed a high risk unit. Also a very debatable point is to what degree has the project reduced its Test and Evaluation (T&E) program. Personnel within BENDER contend that all it amounted to was a shift in emphasis from flight testing to ground testing and that there was still sufficient flight tests to adequately prove BENDER's capability. DDR&E personnel would appear to not be satisfied with the T&E program, at least in view of paragraph 3 of Exhibit (IV-4). In fact conversations with BENDER personnel about that paragraph seem to indicate that it is going to result in only minor changes in the existing T&E program.

The most important point to consider in this area is the impact of the reduction in the development effort on the Dynamic BENDER. This was initially requested by NAVAIR so it is therefore necessary to consider what they might have considered as a viable back-up to a high risk system. (It

is even possible that they might not have considered the Vectored BENDER as being high risk.) The only apparent possible fall-back position would be reliance on the improved RATTLER. This may bring up the side issue of parallel development - is parallel development a viable alternative in today's environment?

2. What are some of the major points that must be considered by the project staff in preparing for the Management Review?

Exhibit (IV-1) will give the student a good idea of the management topics that must be covered. It is necessary to realize that many of those in OSD may not believe that NWC has the management capability to handle a program of this size. Therefore, in preparation for the review it is necessary to build an effective marketing pitch for keeping management responsibility at NWC. For the technical portion it is necessary the program staff realize that if there exists any technical problem areas that OSD is probably aware they exist. Therefore, they had better be able to give a realistic plan for solving these problems.

Another approach that might be taken is one that is somewhat more positive. That is, to approach the upcoming review with the concept of what do we, the BENDER Program, want to get out of this review. This could possibly be a much more effective approach than the previous one. It is almost certain to generate more enthusiasm within the program in preparation for the review.

Part Two

1. Would you interpret this memorandum to indicate the end of the field development concept?

Look at paragraph 1.c of Exhibit (IV-4). This would seem to indicate so. But the student must recognize that not every memorandum is implemented exactly as would seem to be obvious. In this case a project office might be established within NAVAIR but that might not necessarily mean the end of field development. That would depend on how the actual day to day decisions are really handled. In any case a project manager in NAVAIR with 3000 miles between him and the project he is managing will still probably have trouble. To further complicate his job he does not have a formal contract with NWC like he would with a regular development contractor, to insure they do what he says. Overall now that NWC has had a taste of independent development (i.e. being responsible for management of the development program) it may be difficult to ever return the entire management responsibility to NAVAIR.

2. What do you think the impact of this memorandum will be on the BENDER Program?

This question should enable the student to explore a wide range of possibilities. Some three months after the memorandum was written it has just reached ASN(R&D)'s Office. It is therefore too early to tell how it will be implemented. So far the knowledge of what the memorandum says has had very little effect on the day to day operations of the BENDER

Program. The Program Staff at NWC do contend that when the official memorandum with implementing instructions finally reaches NWC it will have very little actual effect on the way things are currently operating.

One thing that has happened as a result of the Management Review was the BENDER Program Staff found out that it must now take seriously an Air Force effort to develop a competing short-range air-to-air missile. Previously, due to inadequate information, BENDER had tended to believe in the statement of DEPSECDEF on development of only one missile for joint service use. The thing that the BENDER staff failed to recognize was that the Air Force missile was much less costly and much lighter than BENDER and also that the Air Force may not necessarily feel they need BENDER on its new fighter. The BENDER Program is very concerned about getting a commitment from the Air Force to buy BENDER because a larger production run can significantly reduce the unit production cost. The Air Force seems to come across with the feeling "don't push me. If I like the production version of BENDER, I'll buy some, but build it first. Then I'll decide."

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Two cases have been developed to examine the concept of assigning to a Navy Laboratory the management responsibility for the development of an air-to-air missile system. The first case examines the organizational relationships and operational difficulties that have resulted from this "field development" concept. The second case discusses the

Management Review, a program control technique used by the Office of the Secretary of Defense, to examine some related problems created by this different development approach. A teaching commentary is included to assist the instructor in his preparation for use of the cases in the classroom.